

**REPORT OF THE REGIONAL MONITORING PROGRAM
FOR THE NEWPORT/SAN DIEGO CREEK
WATERSHED NUTRIENT TMDL
(Resolution No. 98-9, as amended by Resolution No. 98-100)**

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Prepared and submitted on behalf of:

**The County of Orange
and
The Cities of Irvine, Tustin, Newport Beach,
Lake Forest, Santa Ana, Orange and Costa Mesa**

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1.0 INTRODUCTION

The Nutrient TMDL for the Newport Bay/San Diego Creek Watershed (Resolution No. 98-9, as amended by Resolution No. 98-100) requires that the Santa Ana Regional Water Quality Control Board (Regional Board) establish and oversee a regional monitoring program (RMP) for the Newport Bay watershed. The RMP is a coordinated program among the stakeholders to assess the attainment of the goals of the nutrient TMDL. The stated objectives of the monitoring program are to quantify the three endpoints of the nutrient TMDL: 1) the seasonal nutrient loading from the watershed; 2) the nutrient concentration in San Diego Creek, Reaches 1 and 2; and 3) the extent, magnitude, and duration of algal blooms in San Diego Creek and Newport Bay.

The RMP is composed of two components: a routine monitoring component and a special monitoring component. The routine monitoring includes most of the traditional monitoring that has occurred in the watershed. The special monitoring includes investigations into unanswered questions about nutrient sources and dynamics in the watershed.

This report is a summary of the results of the routine monitoring component. The County of Orange initiated this element of the RMP in February 2000 as a cooperative program with the cities of Costa Mesa, Irvine, Laguna Hills, Laguna Woods, Lake Forest, Newport Beach, Orange, Santa Ana, and Tustin. The reporting period covered by this report is July 1, 2000 – June 30, 2001. The monitoring was conducted according to the outline based on Regional Board guidance (**Appendix A**).

As part of the RMP, monitoring is conducted at nine sites in the Upper Newport Bay watershed and five sites in the Newport Bay. **Figure 1** is a map of these locations. **Table 1** is a list of the sites and the monitoring frequencies.

2.0 SAMPLING METHODS

Automatic samplers were used to collect composite samples at eight of the nine watershed sites. The site at Agua Chinon was grab sampled because shifting bed material and low channel discharge rates hampered automatic sampling.

The five locations in the Newport Bay were grab-sampled. Dry weather monitoring at these sites included sampling at the surface mid-depth and bottom of the water column. Subsurface samples were collected using an ISCO peristaltic pump, tygon tubing and a weighted sample strainer.

3.0 WATERSHED SAMPLING RESULTS

All data from the monitoring in Upper Newport Bay watershed are contained in **Appendix B** including the results of a special one-week intensive sampling in May 2001 of San Diego Creek, Peters Canyon Wash, and its tributaries. These data were evaluated by computing simple statistics on the dry weather and storm runoff component from each site. Data from the May 2001 nutrient study were not included in the statistics because for most sites, the large amount of data collected during this one-week study would skew the annual mean. **Table 2** is a summary of the statistics. The Central Irvine Channel, a tributary to Peters Canyon Wash, is monitored as part of the NPDES urban runoff program. Because this channel is a major contributor of nutrients to the San Diego Creek watershed its data are also included in this report.

3.1 Nutrient Concentrations

Figure 2 is a graphical summary of the mean dry and wet-weather nitrate nitrogen concentrations measured at the RMP watershed sites and the Central Irvine Channel (station code CICF25). **Figure 3** is a summary of the total nitrogen concentrations. **Figure 4** shows the number of samples collected from each site. The results show that the greatest mean concentration of nitrate nitrogen was measured in the Central Irvine Channel during dry weather conditions.

3.2 Flow Measurements

Continuous water level recording gages are maintained at El Modena Irvine Channel, Peters Canyon Wash, San Diego Creek at Culver, San Diego Creek at Campus, and Santa Ana Delhi Channel, Lane Channel, and Costa Mesa Channel. Storm hydrographs (water level vs. time) from each monitored storm are presented in **Appendix C**.

With the exception of Costa Mesa and Lane Channels, rating curves based on numerous field measurements, have been developed. Until reliable ratings can be developed for Lane and Costa Mesa, discharge rates will be estimated by the Manning Equation. Preliminary streamgaging measurements at Costa Mesa and Lane Channels, however show that the Manning Equation overestimates the discharge rate at the lower end of the rating curve. The mean daily discharge rates for the streamgages with established channel ratings are presented in **Table 3**.

3.3 Nutrient Loads

The dry weather and stormwater nutrient loads from this monitoring period were calculated for each of the channels with established ratings. The loads from each sampled storm are presented in **Table 4**. The mean dry-weather nitrate nitrogen and total nitrogen loads from each site are plotted in **Figure 5**. The daily load from each dry-weather sampling San Diego Creek at Campus Drive is presented in **Figure 6**. The plot of mean nitrate nitrogen and total nitrogen load shows that the average load from Peters Canyon Wash exceeds those measured in San Diego Creek at Campus Drive. The

reduction in the loads downstream is due primarily to the operation of the Irvine Ranch Water District's (IRWD) Wetland Treatment system. The 2001 San Diego Creek / Peters Canyon Wash Nutrient study (Appendix R of the 2000/01 NPDES Annual Status Report) discusses this treatment system in more detail.

4.0 BAY SAMPLING RESULTS

Dry weather sampling of the Newport Bay was conducted nine times during the reporting period. The data from storm sampling of the bay although not a requirement of the RMP is included in **Appendix D**.

For the most part, the nitrate concentrations in the lower reaches of the Upper Bay (UNBNSB, UNBCHB) and at Harbor Island Reach (LNBHIR) were below the detection limits of the laboratory (0.44 mg/L as NO₃, 0.10 mg/L as N). **Figure 7** shows the average dry weather concentrations of nitrate in the Bay. As expected the concentrations are greater near the mouth of San Diego Creek and at the surface.

Figure 8 shows the dry weather nitrate concentrations at the uppermost station UNBJAM. With the exception of the June 2001 sampling all concentrations at the surface were greater than 4.0 mg/L as NO₃.

5.0 ALGAL SURVEYS

Alex Horne and Associates provided an analysis of the data collected in the algal biomass surveys. A draft report of this analysis is contained **Appendix E**. A series of infrared aerial photographs were taken of the Bay during the monitoring period. These photographs have been digitized and a composite photo in 11"X 17" format will be provided at a later date.

6.0 DISSOLVED OXYGEN STUDIES

The Irvine Ranch Water District (IRWD) reestablished a remote sensing station in the Upper Bay to monitor temperature, electrical conductivity, pH, and dissolved oxygen during August 2000. Measurements of these parameters were made every 30 minutes and stored in the datalogger of a multi-parameter probe. The monitoring data for August 2000 are presented in **Figures 9 and 10**.

Salinity values varied as a function of tide, with the high tide of the day corresponding to the daily salinity peak. Dissolved oxygen concentrations varied as a function of both time and tide. The highest daily dissolved oxygen concentrations occurred in late afternoon or early evening, regardless of tide stage. These peaks probably corresponded to the end of the period of direct sunlight. If a high tide occurred after the daily dissolved oxygen maximum and before the next sunrise a second smaller dissolved oxygen peak was observed. The dissolved oxygen data near the end of the month (**Figure 10**) appears to be in error due to probe fouling.

Tables

Table 1
RMP Monitoring Frequencies

Station Code	Location	Weather	Special Requirements	Annual Frequency of Measurement							
				Temperature	Dissolved O ₂	pH	Conductivity	Nutrients	ortho - PO ₄	flowrate	hardness
SADF01	Santa Ana Delhi Ch u/s Irvine	Dry	24	24	24	24	24	24	24	365	24
		Storm	3	3	3	3	3	3	3	TS	3
SDMF05	San Diego Creek @ Campus	Dry	52	52	52	52	52	52	52	365	52
		Storm	3	3	3	3	3	3	3	TS	3
BCF04	Bonita Canyon Ch u/s University	Dry	12	12	12	12	12	12	12	12	12
		Storm	3	3	3	3	3	3	3	3	3
CMCG02	Costa Mesa Ch @ Highland*	Dry	12	12	12	12	12	12	12	12	12
		Storm	3	3	3	3	3	3	3	3	3
MIRF07	El Modena Irvine Ch @ Michelle	Dry	12	12	12	12	12	12	12	12	12
		Storm	3	3	3	3	3	3	3	3	3
LANF08	Lane Ch u/s Jamboree	Dry	12	12	12	12	12	12	12	12	12
		Storm	3	3	3	3	3	3	3	3	3
ACWF18	Agua Chinon Wash @ SDC confluence	Dry	12	12	12	12	12	12	12	12	12
		Storm	3	3	3	3	3	3	3	3	3
BARSED	Peters Canyon Wash @ Barranca	Dry	24	24	24	24	24	24	24	365	24
		Storm	3	3	3	3	3	3	3	TS	3
WYLSED	San Diego Creek @ Harvard	Dry	24	24	24	24	24	24	24	365	24
		Storm	3	3	3	3	3	3	3	TS	3
UNBJAM	Upper Newport Bay in Unit I Basin	Dry	S, M, B	12	12	12	12	12	12		
UNBSDC	Upper Newport Bay in Unit II Basin	Dry	S, M, B	12	12	12	12	12	12		
UNBNSB	Upper Newport Bay at North Star Beach	Dry	S, M, B	12	12	12	12	12	12		
UNBCHB	Upper Newport Bay at Coast Highway Bridge	Dry	S, M, B	12	12	12	12	12	12		
LNBHIR	Lower Newport Bay at Harbor Island Reach	Dry	S, M, B	12	12	12	12	12	12		
Horne # 2	South end of Shellmaker Island	Dry		9	9		9	9	9		9
Horne # 4	South tip of Middle Island	Dry		9	9		9	9	9		9
Horne # 8	North end of Middle Island	Dry		9	9		9	9	9		9
Horne # 10	West side of the Narrows	Dry		9	9		9	9	9		9
Horne # 12	Southwest side of Unit II Basin	Dry		9	9		9	9	9		9
Horne # 15	North end of Unit II Basin, West side of dike	Dry		9	9		9	9	9		9
Horne # 18	South side of Unit I Basin	Dry		9	9		9	9	9		9
Horne # 19	North side of Unit I Basin	Dry		9	9		9	9	9		9
Horne # 24	Northeast side of Unit I Basin	Dry		9	9		9	9	9		9

Nutrients = Nitrate + Nitrite, Ammonia, TKN, total Phosphate, TSS, VSS, turbidity

* Sampled weekly as model urban runoff station

S, M, B - surface mid depth, bottom

TS - Total volume of storm runoff and amount sampled

Table 2
Summary of Data from RMP Channels
Excluding May 2001 Nutrient Study Data

Station	NO ₃ as N			NH ₃			TKN			TN			PO ₄			O-PO ₄			TSS			VSS			
	all	Dry	Storm	all	Dry	Storm	all	Dry	Storm	all	Dry	Storm	all	Dry	Storm	all	Dry	Storm	all	Dry	Storm	all	Dry	Storm	
ACWF18	n	12	11	1	12	11	1	12	11	1	12	11	1	11	11	12	11	1	12	11	1	12	11	1	
	mean	6.44	6.76	3	0.089	0.081	0.175	1.36	1.03	5.00	7.80	7.79	7.94	3.10	2.74	7.04	0.71	0.71	428	47	4620	45.25	11.18	420	
	geomean	5.53	5.86	3	0.073	0.068	0.175	1.07	0.93	5.00	7.18	7.12	7.94	2.83	2.60	7.04	0.64	0.64	36.06	23.19	4620	12.85	9.36	420	
	max	12.0	12.0	3	0.242	0.242	0.175	5.00	2.20	5.00	14.17	14.17	7.94	7.04	4.90	7.04	1.78	1.78	4620	180	4620	420	23	420	
	min	1.2	1.2	3	0.050	0.050	0.175	0.39	0.39	5.00	2.84	2.84	7.94	1.84	1.84	7.04	0.40	0.40	10	10	4620	1.00	1.00	420	
	std dev	3.17	3.12		0.066	0.064		1.25	0.51		3.11	3.27		1.57	1.01		0.40	0.40	1321	59		118.12	5.25		
SADF01	n	39	20	19	39	20	19	39	20	19	39	20	19	39	20	19	39	20	19	39	20	19	39	20	19
	mean	3.24	3.24	3.23	0.27	0.07	0.49	1.50	0.86	2.10	4.79	4.14	5.41	0.61	0.29	0.93	0.07	0.03	0.12	47.89	16.40	82.89	16.95	9.80	24.89
	geomean	2.91	2.86	2.96	0.11	0.06	0.20	1.08	0.77	1.49	4.35	3.77	4.98	0.40	0.26	0.64	0.05	0.02	0.10	22.51	14.85	35.74	12.69	9.78	16.96
	max	6.77	6.77	5.65	3.67	0.182	3.67	8.8	1.9	8.8	14.45	7.69	14.45	2.97	0.49	2.97	0.24	0.069	0.24	470	32	470	110	10	110
	min	0.52	0.52	1.33	0.05	0.05	0.05	0.2	0.2	0.54	0.83	0.83	2.70	0.061	0.061	0.0918	0.01	0.01	0.019	10	10	10	8	8	10
	std dev	1.44	1.56	1.33	0.63	0.04	0.85	1.68	0.39	2.17	2.3	1.7	2.6	0.67	0.13	0.85	0.07	0.02	0.07	89.62	7.82	122.26	20.76	0.62	28.47
BARSED	n	42	19	23	42	19	23	42	19	23	42	19	23	42	19	23	42	19	23	42	19	23	42	19	23
	mean	11.90	11.87	10.32	0.25	0.10	0.39	2.16	1.21	3.05	14.34	13.69	14.87	1.56	0.83	2.24	0.25	0.17	0.33	104.95	19.89	182.73	23.81	10.21	36.18
	geomean	10.47	11.21	9.21	0.13	0.07	0.25	1.60	1.11	2.27	13.14	13.02	13.24	1.24	0.75	1.95	0.20	0.13	0.31	37.76	16.96	80.08	16.42	10.15	25.45
	max	47.42	21.90	22.58	1.42	0.757	1.42	12	2.6	12	48.13	24.50	48.13	4.59	1.71	4.59	0.546	0.417	0.546	620	48	620	110	15	110
	min	3.61	7.45	3.61	0.05	0.05	0.05	0.4	0.4	0.47	5.61	8.75	5.61	0.306	0.306	0.857	0.024	0.024	0.15	10	10	10	8	8	10
	std dev	7.37	4.36	5.20	0.33	0.16	0.38	2.14	0.49	2.65	7.13	4.66	8.74	1.14	0.37	1.18	0.15	0.11	0.13	163.33	12.13	196.58	25.83	1.27	31.06
WYLSED	n	37	19	18	37	19	18	37	19	18	37	19	18	37	19	18	37	19	18	37	19	18	37	19	18
	mean	11.08	14.29	7.69	0.17	0.05	0.29	1.71	1.01	2.44	12.75	15.21	10.15	1.11	0.35	1.91	0.16	0.07	0.26	141.84	20.32	270.11	24.43	10.21	39.44
	geomean	9.87	13.17	7.27	0.10	0.05	0.18	1.28	0.85	2.00	11.84	14.22	9.75	0.58	0.23	1.54	0.10	0.04	0.24	38.96	13.85	116.04	14.99	9.02	25.65
	max	18.97	18.97	11.97	1.33	0.13	1.33	7.9	4	7.9	20.94	20.94	15.44	5.51	1.71	5.51	0.53	0.21	0.53	1150	150	1150	150	28	150
	min	2.26	2.26	3.84	0.05	0.05	0.05	0.2	0.2	0.63	3.19	3.19	5.56	0.061	0.061	0.52	0.01	0.01	0.111	10	10	10	1	1	10
	std dev	4.81	4.21	2.56	0.25	0.02	0.32	1.52	0.79	1.76	4.47	4.35	2.88	1.23	0.38	1.31	0.14	0.07	0.12	251.08	31.95	313.83	30.53	4.88	38.52
BCF04	n	22	11	11	22	11	11	22	11	11	22	11	11	22	11	11	22	11	11	22	11	11	22	11	11
	mean	0.66	0.67	0.64	0.06	0.05	0.07	0.85	0.65	1.05	1.48	1.26	1.69	0.59	0.36	0.82	0.08	0.05	0.12	117.73	61.27	174.18	16.36	13.45	19.27
	geomean	0.56	0.56	0.56	0.05	0.05	0.06	0.74	0.58	0.95	1.32	1.12	1.55	0.44	0.29	0.68	0.06	0.04	0.11	50.83	29.01	89.08	13.95	11.97	16.26
	max	2.48	2.48	1.38	0.213	0.05	0.213	2.3	1.8	2.3	3.68	3.00	3.68	1.59	0.826	1.59	0.219	0.143	0.219	540	300	540	42	40	42
	min	0.16	0.34	0.16	0.05	0.05	0.05	0.31	0.31	0.43	0.58	0.58	0.77	0.092	0.092	0.153	0.02	0.02	0.046	10	10	10	10	10	10
	std dev	0.48	0.61	0.34	0.04	0.00	0.05	0.50	0.40	0.53	0.78	0.73	0.79	0.42	0.24	0.44	0.06	0.04	0.07	149.8	90.5	178.6	11.02	9.13	12.37
LANF08	n	27	14	13	27	14	13	27	14	13	27	14	13	27	14	13	27	14	13	27	14	13	27	14	13
	mean	5.87	7.49	4.37	0.34	0.11	0.55	1.98	1.02	2.88	7.78	8.18	7.36	1.20	1.04	1.35	0.19	0.21	0.17	73.78	20.31	123.43	17.96	9.46	25.86
	geomean	5.03	7.25	3.58	0.20	0.09	0.40	1.55	1.00	2.31	7.00	7.88	6.17	1.01	0.89	1.15	0.17	0.18	0.16	31.73	16.98	56.72	12.39	8.50	17.57
	max	9.94	9.94	7.90	2	0.241	2	9.1	1.3	9.1	14.97	10.89	14.97	4.9	2.42	4.9	0.544	0.544	0.27	700	60	700	120	11	120
	min	1.06	4.74	1.06	0.05	0.05	0.18	0.69	0.69	0.99	2.26	3.87	2.26	0.21	0.21	0.73	0.068	0.068	0.1	10	10	10	1	1	10
	std dev	2.69	1.90	2.48	0.44	0.07	0.54	1.85	0.19	2.24	3.25	2.13	4.19	0.87	0.57	1.08	0.09	0.12	0.05	141.77	15.06	185.67	23.23	2.57	30.56

Table 2
Summary of Data from RMP Channels
Excluding May 2001 Nutrient Study Data

Station	NO ₃ as N			NH ₃			TKN			TN			PO ₄			O-PO ₄			TSS			VSS			
	all	Dry	Storm	all	Dry	Storm	all	Dry	Storm	all	Dry	Storm	all	Dry	Storm	all	Dry	Storm	all	Dry	Storm	all	Dry	Storm	
CICF25	n	24	23	1	24	23	1	24	23	1	24	23	1	24	23	1	24	23	1	24	23	1	24	23	1
	mean	30.93	31.41	19.9	3.68	3.81	0.69	6.36	6.46	3.9	36.91	37.49	23.77	5.83	5.76	7.34	1.71	1.70	1.86	91.00	90.91	93.0	19.92	20.17	14.0
	geomean	26.56	26.90	19.9	0.67	0.67	0.69	4.15	4.16	3.9	31.79	32.19	23.77	4.81	4.73	7.34	1.33	1.31	1.86	42.10	40.67	93.0	14.83	14.86	14.0
	max	65.48	65.48	19.87	21.2	21.2	0.69	30	30	3.9	88.48	88.48	23.77	13.5	13.5	7.34	5.59	5.59	1.86	600	600	93.0	130	130	14.0
	min	7.23	7.23	19.87	0.05	0.05	0.69	0.24	0.24	3.9	10.53	10.53	23.77	0.918	0.918	7.34	0.26	0.26	1.86	10	10	93.0	9	9	14.0
	std dev	16.14	16.32		5.89	5.98		6.96	7.10		20.56	20.83		3.28	3.34		1.23	1.25		129.48	132.38		24.82	25.34	
MIRF07	n	19	12	7	19	12	7	19	12	7	19	12	7	19	12	7	19	12	7	19	12	7	19	12	7
	mean	2.22	2.47	1.89	0.12	0.13	0.08	2.04	2.33	1.60	4.27	4.73	3.49	0.97	0.98	0.92	0.16	0.16	0.18	21.21	16.91	27.57	10.11	9.64	10.71
	geomean	1.93	2.23	1.54	0.09	0.10	0.07	1.76	2.03	1.39	3.93	4.61	2.99	0.87	0.84	0.88	0.15	0.14	0.17	17.82	15.16	22.03	9.30	8.44	10.60
	max	5.19	5.19	4.06	0.343	0.343	0.15	5.6	5.6	3.4	7.46	6.80	7.46	2.14	2.14	1.25	0.293	0.293	0.286	60	40	60	15	14	15
	min	0.54	1.15	0.54	0.05	0.05	0.05	0.68	0.68	0.78	1.35	3.31	1.35	0.367	0.367	0.612	0.077	0.077	0.128	10	10	10	1	1	10
	std dev	1.19	1.23	1.21	0.09	0.11	0.04	1.20	1.34	0.96	1.64	1.14	2.13	0.45	0.55	0.28	0.08	0.08	0.07	14.92	9.21	21.08	2.62	3.11	1.89
CMCG02	n	60	41	19	60	41	19	60	41	19	60	41	19	60	41	19	60	41	19	60	41	19	60	41	19
	mean	2.53	1.44	4.87	0.33	0.16	0.69	4.27	3.19	6.61	6.80	4.63	11.47	6.85	9.00	2.21	0.35	0.32	0.40	42.08	26.02	78.67	21.80	13.61	40.44
	geomean	0.58	0.39	1.41	0.13	0.10	0.25	2.36	2.21	2.70	3.55	3.14	4.64	1.39	1.31	1.57	0.25	0.23	0.32	20.30	16.56	32.26	12.69	10.30	20.41
	max	63.23	14.90	63.23	4.24	2.11	4.24	64	22	64	67.61	22.52	67.61	309	309	9.18	0.99	0.93	0.99	500	270	500	230	78	230
	min	0.10	0.10	0.15	0.05	0.05	0.05	0.84	0.84	0.87	1.22	1.34	1.22	0.184	0.184	0.275	0.01	0.01	0.06	10	10	10	1	1	10
	std dev	8.47	3.37	14.20	0.71	0.32	1.10	8.88	4.07	14.61	12.44	5.06	20.40	39.70	48.04	2.17	0.25	0.23	0.28	82.03	43.79	128.08	36.84	13.35	60.67
SDMF05	n	60	39	21	60	39	21	60	39	21	60	39	21	60	39	21	60	39	21	60	39	21	60	39	21
	mean	7.89	7.46	8.77	0.15	0.08	0.29	1.78	1.68	2.04	9.76	9.19	10.82	1.02	0.75	1.56	0.12	0.07	0.21	112.07	82.03	178.47	19.37	17.41	23.89
	geomean	6.53	6.32	6.93	0.09	0.07	0.19	1.60	1.51	1.86	8.84	8.57	9.35	0.70	0.54	1.17	0.06	0.03	0.15	73.24	65.45	98.29	16.55	16.03	18.16
	max	47.42	14.00	47.42	1.12	0.628	1.12	3.6	3.2	3.6	48.06	15.40	48.06	6.12	6.12	3.98	0.41	0.334	0.41	900	280	900	88	48	88
	min	0.77	0.77	2.48	0.05	0.05	0.05	0.27	0.27	0.64	2.65	2.65	4.58	0.061	0.061	0.061	0.01	0.01	0.025	10	10	11	10	10	10
	std dev	6.10	3.58	9.41	0.20	0.10	0.27	0.77	0.71	0.83	5.80	3.19	8.85	1.02	0.94	1.01	0.12	0.09	0.14	144.29	55.85	231.16	14.16	7.87	21.93

Table 3
Mean Daily Discharge Rates (cfs) at RMP Streamgages

	San Diego Creek at Campus Drive											
	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN
1	10.5	11.1	17.4	9.4	7.2	16.0	9.5	7.6	41.2	11.9	9.0	11.8
2	10.0	10.2	13.1	9.2	6.2	16.0	10.2	7.5	24.9	12.1	10.0	14.9
3	9.8	7.9	13.0	8.9	6.2	15.4	11.1	7.4	24.0	9.9	7.2	17.0
4	9.5	12.7	13.8	9.8	5.7	15.0	11.5	7.8	22.8	9.5	8.1	13.5
5	9.2	12.5	14.0	10.0	6.8	15.0	10.2	8.2	23.0	36.7	11.2	7.0
6	9.2	20.2	12.9	9.2	14.6	15.0	11.7	8.8	116.7	15.6	14.1	6.6
7	8.9	13.0	10.9	10.0	12.2	14.6	12.4	8.0	38.9	260.9	15.5	6.1
8	8.9	13.0	12.0	9.9	11.7	15.0	182.3	7.9	27.7	23.5	13.1	7.8
9	8.7	13.0	11.4	9.6	12.0	14.0	34.6	8.4	21.3	21.1	12.2	6.7
10	8.7	13.0	11.8	12.6	13.0	14.0	381.7	32.5	92.0	17.3	11.1	5.4
11	8.7	13.0	11.4	15.1	18.4	14.0	1828.9	15.3	18.9	10.2	11.9	5.7
12	9.4	13.4	11.0	16.2	15.2	14.7	411.2	1667.7	17.1	9.4	12.2	8.9
13	12.1	14.0	11.0	14.5	13.8	14.5	28.7	1024.1	17.0	9.3	12.7	9.7
14	10.5	14.0	11.0	11.6	13.8	10.6	18.8	56.2	16.7	9.1	8.2	10.1
15	10.0	14.0	11.0	12.0	13.0	8.5	16.4	19.0	14.5	9.6	5.7	10.4
16	9.9	14.0	11.0	12.0	13.0	8.8	13.0	17.4	12.7	10.4	5.5	10.7
17	9.9	14.0	11.0	12.0	13.0	8.3	10.3	15.9	12.0	9.1	8.4	9.7
18	12.3	9.7	11.0	12.0	13.0	7.9	11.0	16.1	11.9	11.3	8.6	9.4
19	12.5	11.1	11.1	12.0	13.1	7.5	11.2	20.8	12.1	11.3	8.9	12.6
20	11.4	13.0	11.5	12.0	13.9	7.1	8.4	54.5	12.1	9.5	9.7	17.3
21	10.2	12.3	9.8	12.0	14.0	6.9	8.7	19.5	12.0	70.7	10.7	17.7
22	9.4	8.9	13.2	12.0	14.0	6.9	10.1	18.9	12.5	6.6	9.9	17.0
23	9.8	7.1	60.5	12.0	14.0	6.6	9.6	114.2	11.1	16.4	14.0	13.9
24	9.5	6.2	10.6	12.0	14.2	8.1	91.9	41.1	10.1	11.2	9.3	12.9
25	9.4	8.8	11.0	12.0	15.0	8.6	14.8	1015.1	11.4	9.3	10.7	10.9
26	9.4	8.4	11.0	17.6	15.0	7.3	373.9	741.8	10.4	6.0	11.0	11.5
27	9.5	9.0	10.6	521.0	15.0	7.4	78.1	139.2	7.6	13.7	13.6	11.3
28	9.7	8.9	10.0	20.1	15.3	8.6	12.1	66.5	5.6	14.5	21.8	10.2
29	9.7	9.3	10.0	90.4	16.5	8.6	9.1		8.9	14.5	12.4	10.8
30	10.0	9.0	9.7	181.7	16.6	9.3	8.1		8.4	9.6	12.1	10.1
31	9.9	10.3		13.4		9.2	8.1		8.3		11.5	
TOTAL	306.60	354.94	397.99	1132.26	385.19	339.40	3657.46	5167.53	683.71	690.18	340.41	327.51
MEAN	9.89	11.45	13.27	36.52	12.84	10.95	117.98	184.55	22.06	23.01	10.98	10.92
MAX	12.48	20.21	60.55	521.02	18.44	16.00	1828.89	1667.72	116.68	260.93	21.82	17.68
MIN	8.70	6.24	9.74	8.91	5.66	6.65	8.14	7.40	5.57	5.96	5.49	5.41
AC-FT	608.13	704.02	789.40	2245.81	764.02	673.19	7254.48	10249.66	1356.11	1368.95	675.20	649.61

Table 3
Mean Daily Discharge Rates (cfs) at RMP Streamgages

	Peters Canyon Wash											
	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN
1	5.66	4.36	2.60	4.63	5.51	4.73	3.94	6.85	8.72	8.44	5.92	7.03
2	5.45	4.57	2.60	4.76	5.86	4.97	4.04	6.82	6.17	8.10	5.60	6.52
3	5.38	4.42	2.67	4.97	5.67	4.78	3.44	6.63	5.75	6.87	6.41	6.83
4	4.77	4.43	2.63	5.28	5.63	4.90	3.50	6.55	5.60	7.17	8.12	6.51
5	4.43	4.49	2.67	5.06	5.41	4.27	3.74	6.75	5.43	17.48	8.77	6.64
6	4.80	4.37	2.91	4.75	5.07	4.59	3.29	6.88	35	6.95	9.93	6.55
7	5.14	4.41	4.04	5.44	5.70	4.72	2.91	6.22	8.88	35	9.41	6.89
8	5.22	4.66	4.44	5.77	6.19	5.31	6.04	6.02	8.01	6.08	6.71	7.20
9	5.25	4.39	4.77	5.24	5.63	5.34	6.11	5.14	13	6.31	6.89	7.31
10	5.48	4.17	4.91	6.81	5.64	5.23	41	12	23	6.84	7.14	7.09
11	6.04	4.14	4.78	7.36	5.18	5.32	808	6.21	8.41	6.61	6.98	6.70
12	6.01	4.17	4.36	5.28	4.93	4.55	46	1004	7.92	5.93	7.12	7.59
13	6.31	4.22	4.92	4.84	4.71	4.46	6.76	501	7.33	5.76	6.61	6.73
14	6.24	3.67	5.04	4.77	5.05	4.31	5.00	13.90	7.62	6.38	6.75	6.75
15	6.60	3.00	4.54	5.09	5.47	4.37	4.54	8.61	7.60	6.04	6.70	6.47
16	6.27	3.00	4.73	4.33	5.71	4.26	3.77	7.20	7.39	5.08	6.45	6.95
17	6.78	3.00	5.58	5.24	4.44	3.77	3.34	6.47	7.61	5.00	6.09	7.38
18	5.61	2.91	5.81	5.16	4.23	3.28	3.67	6.63	8.61	5.00	6.89	7.14
19	4.34	2.90	6.56	5.70	4.51	3.58	3.93	9.58	7.82	4.51	7.38	7.42
20	4.40	2.90	7.82	6.62	4.50	4.36	3.90	12	8.32	4.36	6.96	7.54
21	4.46	2.90	7.07	6.58	4.28	4.39	4.35	7.38	8.03	26	6.65	7.89
22	4.44	2.78	7.20	6.43	4.20	4.38	4.33	6.62	8.27	5.52	6.58	7.78
23	4.47	2.70	11.37	6.52	4.11	4.63	4.34	32.10	8.59	4.94	6.46	8.01
24	4.77	2.70	3.82	7.80	4.49	4.24	27	15.65	8.30	5.16	6.77	7.76
25	5.50	2.70	3.90	8.40	4.79	3.40	4.43	490	8.67	5.87	7.41	8.40
26	5.49	2.67	3.91	10	4.22	3.07	146	166	8.57	6.46	7.64	8.25
27	5.42	2.60	3.86	109	4.50	3.56	11	57	8.57	6.54	11.66	7.99
28	4.62	2.60	5.15	7.01	4.92	3.89	5.68	31	8.37	6.48	8.73	8.21
29	4.71	2.67	4.80	9.48	5.30	3.89	6.20		8.26	6.13	7.63	7.65
30	5.07	2.70	4.82	13	5.24	4.59	7.03		8.19	5.92	6.65	7.63
31	4.76	2.60		5.82		4.43	7.07		8.16		6.96	
TOTAL	163.88	107.81	144.31	296.61	151.09	135.56	1193.00	2449.77	290.34	242.28	225.98	218.83
MEAN	5.29	3.48	4.81	9.57	5.04	4.37	38.48	87.49	9.37	8.08	7.29	7.29
MAX	6.8	4.7	11.4	108.7	6.2	5.3	807.5	1003.8	35.2	34.7	11.7	8.4
MIN	4.3	2.6	2.6	4.3	4.1	3.1	2.9	5.1	5.4	4.4	5.6	6.5
AC-FT	325.04	213.83	286.23	588.32	299.68	268.88	2366.29	4859.05	575.89	480.55	448.23	434.04

Table 3
Mean Daily Discharge Rates (cfs) at RMP Streamgages

	San Diego Creek at Culver											
	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN
1	0.56	1.18	1.15	1.08	3.29	1.39	1.52	2.01	13	2.80	2.51	0.87
2	0.62	1.38	1.14	1.21	2.56	1.54	1.93	2.09	3.86	2.81	2.68	0.91
3	0.70	1.57	0.91	1.19	2.41	1.60	2.13	2.07	2.98	3.11	2.51	0.85
4	0.76	1.73	0.82	1.28	2.10	1.53	2.14	1.92	2.24	3.30	2.61	0.82
5	0.90	1.51	0.92	2.28	1.93	1.41	1.91	1.94	2.45	3.30	2.56	0.84
6	0.78	1.33	1.06	1.60	2.28	1.18	1.77	2.13	93	3.42	2.01	0.76
7	0.84	1.25	1.13	1.59	1.91	1.06	1.99	2.20	5.40	148.18	2.11	0.98
8	0.90	1.20	1.26	1.54	1.69	1.10	38	2.28	3.46	13.45	2.53	1.42
9	0.91	1.26	1.45	1.29	3.34	1.20	16	2.34	4.43	25.11	2.42	1.28
10	1.04	1.30	1.53	1.49	3.08	1.09	65	5.24	35	7.36	2.55	1.52
11	1.06	1.30	1.54	5.31	2.65	1.09	790	3.47	4.40	2.16	2.58	1.56
12	1.22	1.30	1.60	3.71	2.18	1.00	185	859	2.98	1.63	2.84	1.11
13	1.55	1.42	1.83	1.15	1.98	1.22	12	493	2.67	1.38	2.84	0.86
14	1.79	1.50	2.13	0.94	1.86	1.27	5.33	26	2.55	1.46	2.14	0.93
15	1.96	2.14	2.30	1.09	1.87	1.28	3.11	22	2.75	1.65	2.08	0.83
16	2.30	2.25	2.47	1.15	1.63	1.38	2.52	5.57	2.85	1.90	2.31	0.76
17	2.58	3.88	2.63	1.28	1.53	1.40	2.21	3.72	2.84	3.32	1.75	0.74
18	2.48	2.01	2.80	1.54	1.61	1.46	1.74	3.22	2.54	3.70	1.41	0.92
19	2.40	2.26	2.97	1.90	1.63	1.50	1.60	6.70	2.29	5.07	1.55	1.11
20	2.25	3.46	2.85	2.04	1.47	1.50	1.52	25	2.28	4.27	2.05	1.30
21	2.20	1.85	3.65	1.96	1.88	1.50	1.42	4.60	2.43	46.68	2.90	1.23
22	1.90	1.06	3.66	1.83	2.08	1.50	1.30	3.13	2.60	3.30	3.31	1.22
23	1.80	1.12	13.21	1.93	2.10	1.39	2.66	85	2.77	2.07	3.31	1.50
24	1.60	0.84	2.86	2.00	1.75	1.47	47	9.00	2.97	1.74	3.09	1.29
25	1.58	1.02	1.62	2.45	2.40	1.50	12	412	3.15	2.10	2.96	1.38
26	1.50	1.53	0.90	18.86	2.17	1.50	65	301	3.15	2.40	3.06	1.14
27	1.44	1.07	0.76	219	2.04	1.50	25	146	3.10	2.54	5.69	1.03
28	1.30	1.22	0.91	11.39	1.84	1.50	4.10	83	3.10	2.51	3.23	0.94
29	1.26	1.24	0.94	5.30	1.50	1.53	2.84		3.08	2.60	1.59	1.29
30	1.20	1.37	0.94	158	1.30	1.60	2.40		2.80	2.60	1.51	1.04
31	1.14	1.40		6.53		1.58	2.40		2.80		0.95	
TOTAL	44.50	48.95	63.95	464.61	62.05	42.77	1303.42	2517.07	226.44	307.91	77.63	32.42
MEAN	1.44	1.58	2.13	14.99	2.07	1.38	42.05	89.90	7.30	10.26	2.50	1.08
MAX	2.6	3.9	13.2	219.2	3.3	1.6	789.7	859.0	93.2	148.2	5.7	1.6
MIN	0.6	0.8	0.8	0.9	1.3	1.0	1.3	1.9	2.2	1.4	0.9	0.7
AC-FT	88.27	97.09	126.84	921.54	123.07	84.84	2585.29	4992.54	449.14	610.74	153.97	64.30

Table 3
Mean Daily Discharge Rates (cfs) at RMP Streamgages

	EI Modena - Irvine Channel											
	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN
1	1.1	1.0	0.9	0.9	1.1	1.8	2.1	1.7	1.9	1.3	1.1	1.3
2	1.1	1.1	0.9	0.8	1.3	1.8	2.4	1.8	1.4	1.3	1.2	1.3
3	1.1	0.9	1.1	0.9	1.0	1.7	2.1	1.9	1.3	1.3	1.2	1.2
4	1.2	1.0	1.2	0.9	1.1	1.8	1.7	1.8	1.3	1.7	1.1	1.2
5	1.3	0.9	1.1	0.9	1.1	1.8	2.0	1.7	1.3	4.3	1.1	1.2
6	1.2	0.9	1.1	0.8	1.2	1.9	2.3	1.7	19.2	1.5	1.1	1.2
7	1.2	1.0	0.8	0.9	1.6	1.8	1.4	1.6	3.7	13.6	1.0	1.2
8	1.2	0.9	0.8	1.0	1.6	1.8	13.3	1.5	1.2	1.3	1.0	1.2
9	1.1	0.8	0.8	0.9	1.7	1.9	2.6	1.5	4.9	1.2	1.1	1.2
10	1.1	0.9	0.8	2.3	1.7	1.8	55	4.8	4.7	1.1	1.1	1.2
11	1.6	0.9	0.7	1.3	1.6	1.8	182	1.9	1.7	1.1	1.2	1.2
12	1.6	0.8	0.8	1.0	2.2	2.0	19	280	1.1	1.0	1.2	1.2
13	1.4	0.7	0.9	0.8	2.3	1.9	2.2	95	1.2	1.0	1.2	1.3
14	1.5	0.8	0.9	0.8	2.1	1.7	1.8	2.8	1.2	1.1	1.2	1.3
15	1.7	0.7	0.8	0.8	2.1	1.5	1.6	1.9	1.2	1.0	1.1	1.4
16	1.1	0.8	0.8	0.9	2.2	1.8	1.4	1.8	1.2	1.0	1.3	1.4
17	1.0	1.0	0.7	1.0	2.3	1.6	1.3	1.9	1.3	1.0	1.5	1.4
18	1.1	1.0	0.7	1.1	2.2	1.6	1.6	2.1	1.2	1.0	1.2	1.3
19	1.1	0.9	0.7	1.0	2.0	1.7	1.3	5.1	1.1	1.1	1.1	1.3
20	1.2	1.1	0.8	1.0	2.3	1.8	1.6	4.2	1.1	1.1	1.0	1.3
21	1.2	1.0	0.9	1.3	1.8	1.8	1.5	2.5	1.1	8.1	1.0	1.3
22	1.2	1.0	2.2	1.5	2.0	1.8	1.6	2.1	1.2	1.1	1.1	1.2
23	1.1	1.0	1.3	1.2	1.9	2.0	1.4	10.7	1.3	1.1	1.1	1.2
24	1.1	1.1	0.8	1.4	1.9	2.2	20	5.1	1.3	1.1	1.1	1.3
25	1.1	0.8	0.9	1.7	1.9	1.7	2.1	98	1.2	1.0	1.1	1.4
26	1.1	0.9	0.9	1.6	1.6	1.2	61	37.2	1.2	1.1	1.1	1.6
27	1.1	0.9	1.0	41	2.0	1.2	2.8	21.5	1.2	1.1	1.3	1.3
28	1.1	0.9	1.0	1.8	2.0	2.0	1.7	12.6	1.2	1.1	1.4	1.3
29	1.1	0.9	0.9	18	1.7	1.4	1.5		1.1	1.1	1.2	1.2
30	1.0	0.9	0.9	2.3	1.7	1.6	1.9		1.1	1.1	1.2	1.2
31	1.1	0.8		1.3		1.6	1.8		1.2		1.3	
TOTAL	37.25	28.36	27.98	93.78	53.44	54.24	395.39	607.02	66.47	56.82	35.84	38.21
MEAN	1.20	0.91	0.93	3.03	1.78	1.75	12.75	21.68	2.14	1.89	1.16	1.27
MAX	1.7	1.1	2.2	41.1	2.3	2.2	181.6	280.0	19.2	13.6	1.5	1.6
MIN	1.0	0.7	0.7	0.8	1.0	1.2	1.3	1.5	1.1	1.0	1.0	1.2
AC-FT	73.88	56.24	55.50	186.01	106.00	107.58	784.24	1204.00	131.83	112.70	71.09	75.79

Table 3
Mean Daily Discharge Rates (cfs) at RMP Streamgages

	Santa Ana Delhi											
	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN
1	1.72	1.72	2.00	2.02	1.91	2.03	1.78	2.67	8.21	2.57	2.57	2.98
2	1.55	2.09	2.24	2.08	1.84	2.18	2.08	2.64	5.87	2.60	3.59	2.75
3	2.47	2.18	1.83	2.09	1.88	2.17	2.33	2.52	4.97	2.88	2.62	2.68
4	1.42	2.05	2.30	1.99	1.99	2.38	2.44	2.31	4.30	2.67	2.44	2.76
5	1.39	1.96	2.26	2.51	2.10	2.38	2.87	2.25	4.03	13.71	2.39	2.59
6	1.20	1.68	2.40	2.23	2.20	2.19	2.71	2.49	31.65	2.67	3.11	2.99
7	1.11	2.00	2.46	1.95	1.74	2.10	2.61	2.64	5.89	38.85	2.50	3.17
8	0.99	2.05	2.73	1.89	1.57	2.09	66.62	2.63	4.48	4.16	2.44	2.93
9	0.88	2.23	2.22	1.89	1.85	1.99	4.58	2.61	4.37	3.38	2.34	3.04
10	2.46	2.13	1.81	3.82	2.09	1.89	93.43	12.33	17.88	3.35	2.39	3.16
11	3.58	2.32	2.41	5.28	2.25	1.80	457	3.86	3.88	2.98	2.76	3.41
12	3.18	2.66	2.81	5.59	1.72	1.59	96	473	3.61	3.26	2.68	3.55
13	2.98	1.96	2.94	1.70	1.53	1.39	6.56	228	3.48	3.37	2.76	4.06
14	2.76	2.51	2.87	1.70	1.55	1.69	4.62	17.61	3.23	3.18	2.76	4.28
15	2.88	2.05	2.83	1.77	1.57	2.01	4.04	6.76	3.20	3.27	2.73	4.47
16	2.74	1.52	2.98	1.70	1.56	2.29	3.74	5.71	3.19	3.29	2.51	5.99
17	2.55	1.46	2.78	1.70	1.66	1.98	3.70	5.45	3.42	3.44	2.39	3.54
18	2.73	1.79	2.95	1.70	1.75	2.38	3.84	6.64	4.00	3.50	2.10	3.88
19	2.92	1.39	3.36	1.76	1.71	2.26	3.41	12.27	6.40	3.78	2.33	4.29
20	2.94	1.35	2.94	1.95	1.76	2.84	3.02	10.99	3.24	3.77	2.64	3.42
21	0.85	1.28	2.78	2.37	1.81	2.46	2.53	4.26	3.69	17.05	3.14	2.70
22	1.14	1.78	4.14	2.23	2.08	2.28	2.51	6.22	3.42	2.88	2.98	2.73
23	1.16	1.79	7.34	2.07	2.05	2.13	2.78	36	3.45	3.28	2.97	2.64
24	1.59	1.68	2.27	1.85	2.47	2.26	28.46	17.15	4.31	2.99	2.80	2.66
25	1.59	1.80	2.48	1.99	2.25	1.71	3.62	264	3.51	2.88	2.82	2.54
26	1.59	1.87	2.50	4.26	2.05	1.72	102	130	3.72	2.72	3.35	2.64
27	1.69	1.70	2.41	136	2.45	1.85	20	68.89	3.23	2.38	3.62	2.80
28	1.67	1.85	2.39	2.09	2.31	1.92	4.01	33.16	3.40	2.31	2.70	2.78
29	1.50	2.45	2.45	32	3.08	2.11	3.36		3.86	2.05	3.05	2.36
30	1.24	1.95	2.36	8.49	1.96	2.13	3.14		2.79	2.02	3.02	2.82
31	1.69	2.23		2.13		1.86	2.78		2.55		2.91	
TOTAL	60.15	59.46	82.25	243.06	58.73	64.06	943.00	1364.36	167.22	151.25	85.38	96.60
MEAN	1.94	1.92	2.74	7.84	1.96	2.07	30.42	48.73	5.39	5.04	2.75	3.22
MAX	3.6	2.7	7.3	136.2	3.1	2.8	457.4	472.9	31.6	38.9	3.6	6.0
MIN	0.8	1.3	1.8	1.7	1.5	1.4	1.8	2.3	2.5	2.0	2.1	2.4
AC-FT	119.31	117.93	163.13	482.11	116.48	127.06	1870.42	2706.18	331.68	300.00	169.34	191.61

Table 4
Total Stormwater Loads from the Newport Bay Watershed

Santa Ana Delhi Channel								
Oct 27-31, 2000	356.2	354.7	5.61	0.568	28.33	26.0	11.15	98.5
Jan 8-12, 2001	1420.9	1389.5	12.16	2.365	235.14	118.9	74.23	502.4
Jan 24-28, 2001	301.8	305.6	5.09	0.294	31.48	17.3	12.16	78.8
Mar 6-10, 2001	125.0	104.7	1.82	0.052	2.79	3.4	0.71	10.5
Total Sampled Load		2154.6	24.69	3.28	297.7	165.5	98.25	690.1
Annual Stormwater Volume	4,980	Site Mean EMC	7.8	2.3	232.4	42.5	35.2	193.3
Calc. Unsampled Load	2,826		29.8	8.6	892.6	327	271	1485
Sampled+Unsampled Load			54.5	11.9	1,190.4	492	369	2,175
Peters Canyon Wash								
Oct 11-14, 2000	25.0	46.0	2.58	0.084	2.43	2.5	0.26	4.9
Oct 27-31, 2000	266.1	271.9	12.50	1.302	131.55	50.2	6.89	87.8
Jan 8-9, 2001	16.9	13.8	0.39	0.080	10.86	3.2	1.39	14.6
Jan 10-12, 2001	1768.0	1756.9	38.22	7.303	715.83	152.7	57.27	524.9
Jan 24-28, 2001	366.9	372.7	27.92	0.836	86.01	15.9	7.26	73.4
Mar 6-10, 2001	164.3	139.6	13.20	0.281	31.09	5.6	2.31	26.5
Total Sampled Load		2600.9	94.8	9.9	977.8	230.1	75.4	732.2
Annual Stormwater Volume	7,546	Site Mean EMC	29.4	2.9	668.6	47.0	20.9	166.1
Calc. Unsampled Load	4,945		197.9	19.7	4,494	632	281	2232
Sampled+Unsampled Load			292.7	29.5	5,472	862	356	2,964
San Diego Creek at Campus Drive								
Oct 10-14, 2000	113.8	118.2	5.55	0.20	18.43	5.9	0.85	29.6
Oct 26-30, 2000	1647.7	1624.0	51.76	6.12	986.48	112.2	46.75	454.2
Jan 8-12, 2001	5663.2	5489.6	109.38	29.09	6,366	611.0	263.85	2,360.8
Jan 24-28, 2001	1107.5	1105.1	34.82	2.52	208	43.4	14.61	149.7
Mar 6-10, 2001	581.6	207.5	9.51	0.03	12.41	3.5	0.64	11.7
Total Sampled Load		8544.4	211.02	37.95	7,591	776.1	326.7	3,006.0
Annual Stormwater Volume	19,797	Site Mean EMC	17.5	4.3	1,003.6	40.7	28.2	160.7
Calc. Unsampled Load	11,253		268.2	66.1	15,349	1244	861	4914
Sampled+Unsampled Load			479.2	104.1	22,940	2,020	1,188.0	7,920
San Diego Creek at Harvard Avenue								
Oct 26-31, 2000	826.4	450.1	16.61	1.41	296.56	35.2	11.24	108.3
Jan 8-12, 2001	2192.2	2097.7	50.44	9.80	2,170	196.5	76.33	763.7
Jan 24-28, 2001	295.1	286.0	13.15	0.85	115.35	15.2	5.41	60.0
Mar 6-7, 2001	193.8	187.3	4.61	0.56	73.27	10.7	3.04	35.5
Total Sampled Load		3021.1	84.8	12.6	2655.1	257.6	96.0	967.6
Annual Stormwater Volume	8,918	Site Mean EMC	17.9	5.4	1353.5	43.6	19.4	185.2
Calc. Unsampled Load	5,897		143.1	43.3	10,846	698	311	2,969
Sampled+Unsampled Load			227.9	55.9	13,502	956	407	3,937

Figures

Figure 1
Nutrient TMDL RMP Routine Monitoring Stations

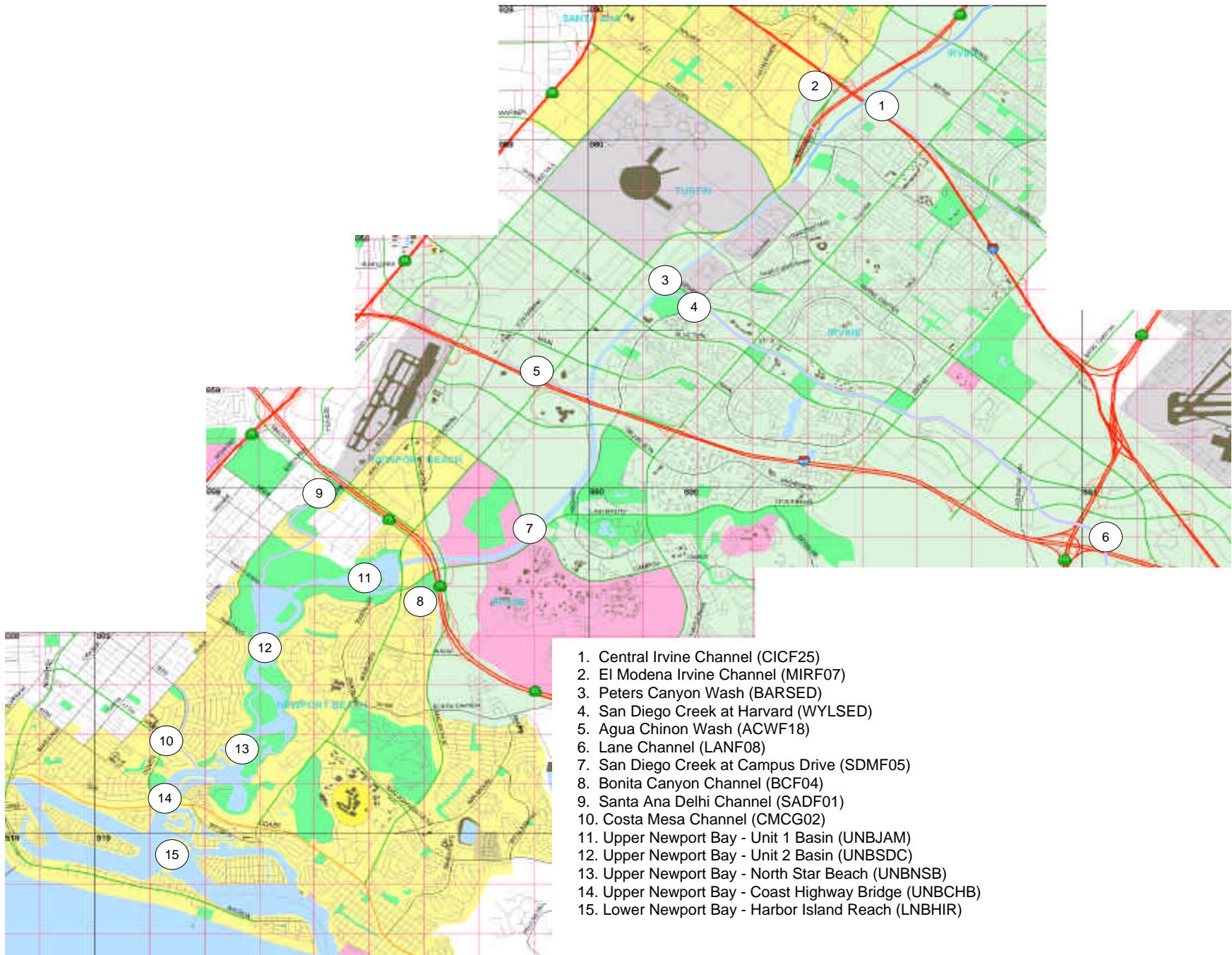


Figure 2
Mean Nitrate Nitrogen Concentrations at RMP Channels

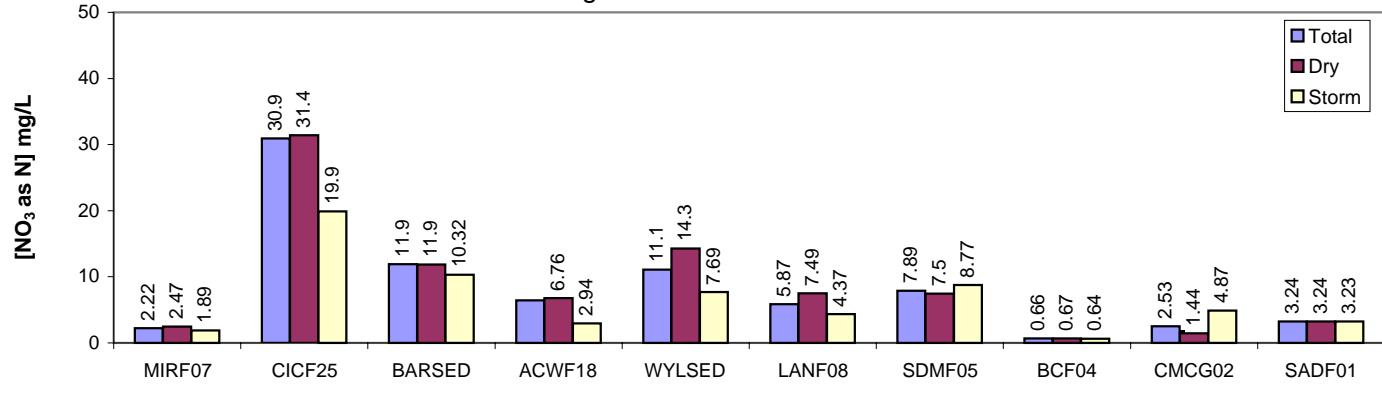


Figure 3
Mean Total Nitrogen Concentrations at RMP Channels

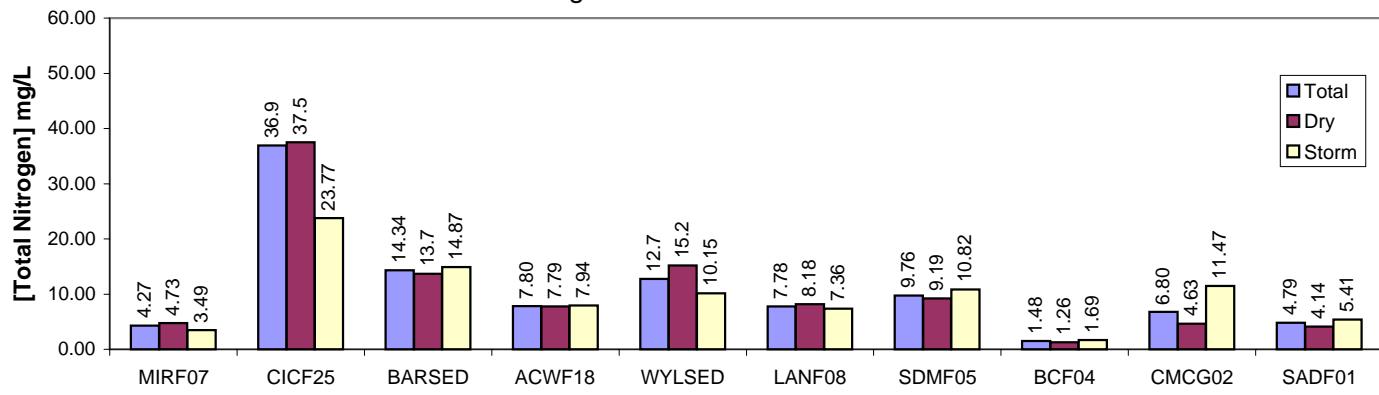
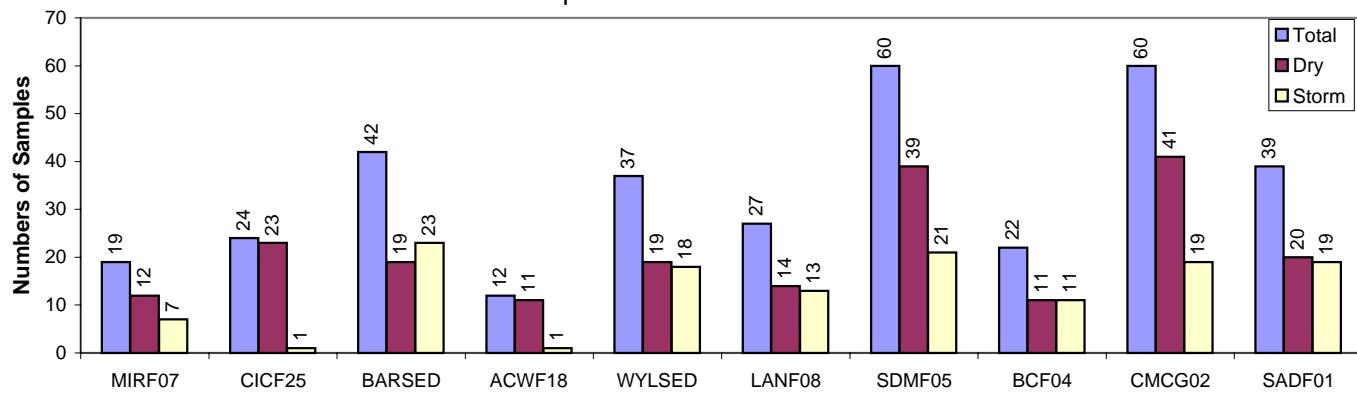


Figure 4
Numbers of Samples Collected from RMP Channels



Excluding May 2001 Nitrate Study Data

Figure 5
Mean Daily Dry-Weather Nitrogen Loads from RMP Channels
July 2000 - June 2001

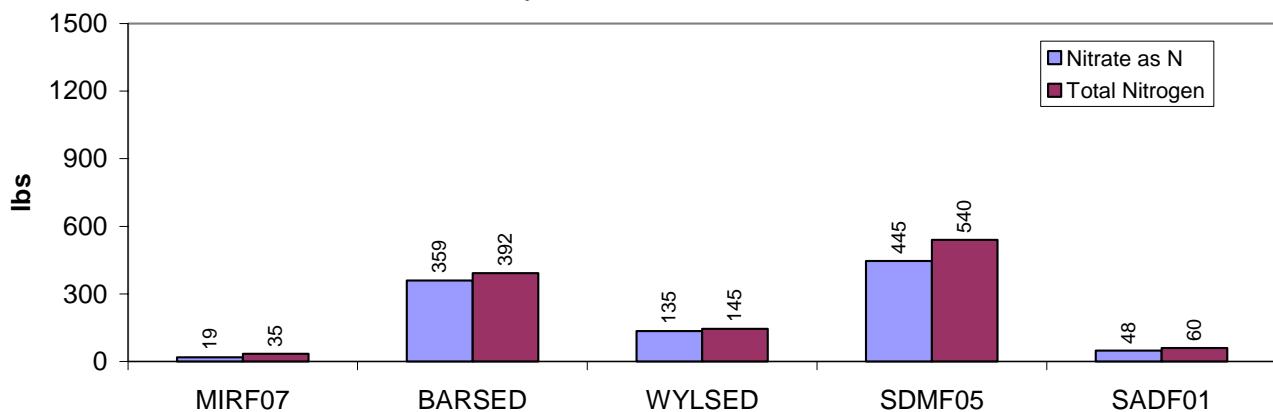


Figure 6
Measured Daily Dry-Weather Total Nitrogen Load
San Diego Creek at Campus Drive

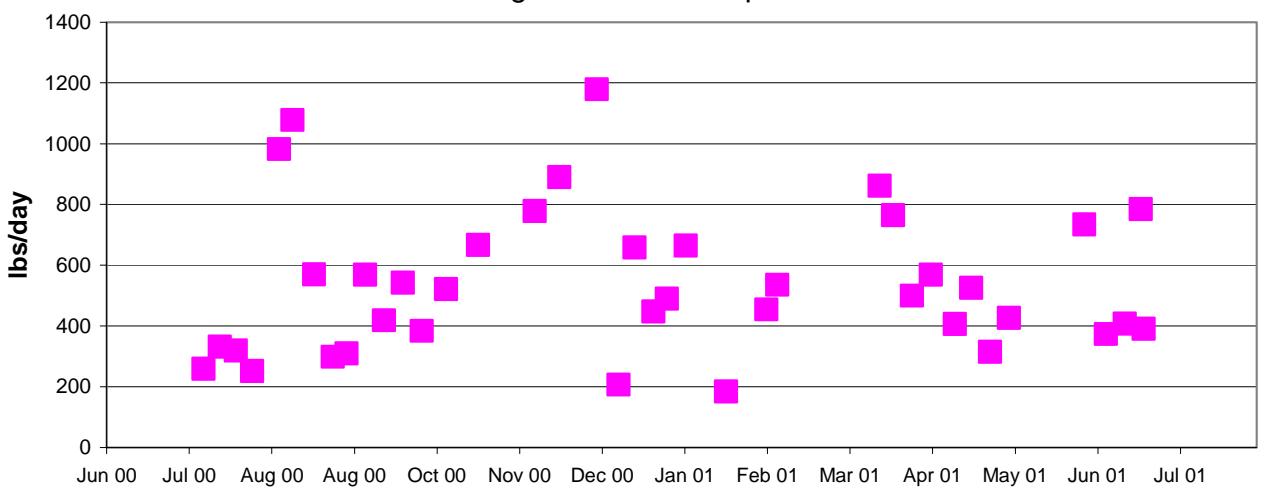


Figure 7
Average Dry Weather Concentration of Nitrate in Newport Bay

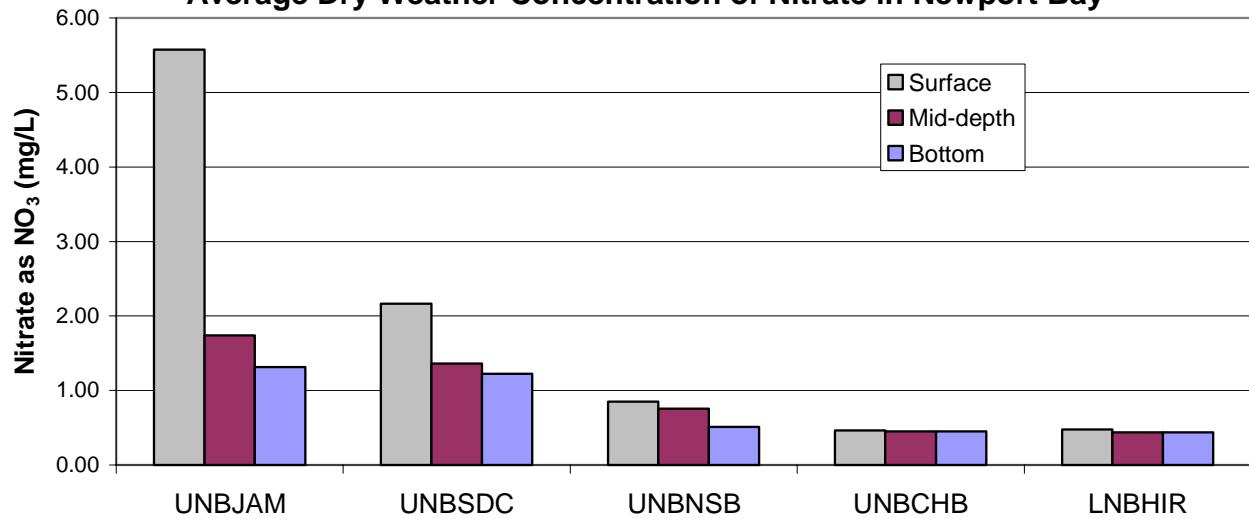


Figure 8
Dry-Weather Nitrate Concentrations at UNBJAM

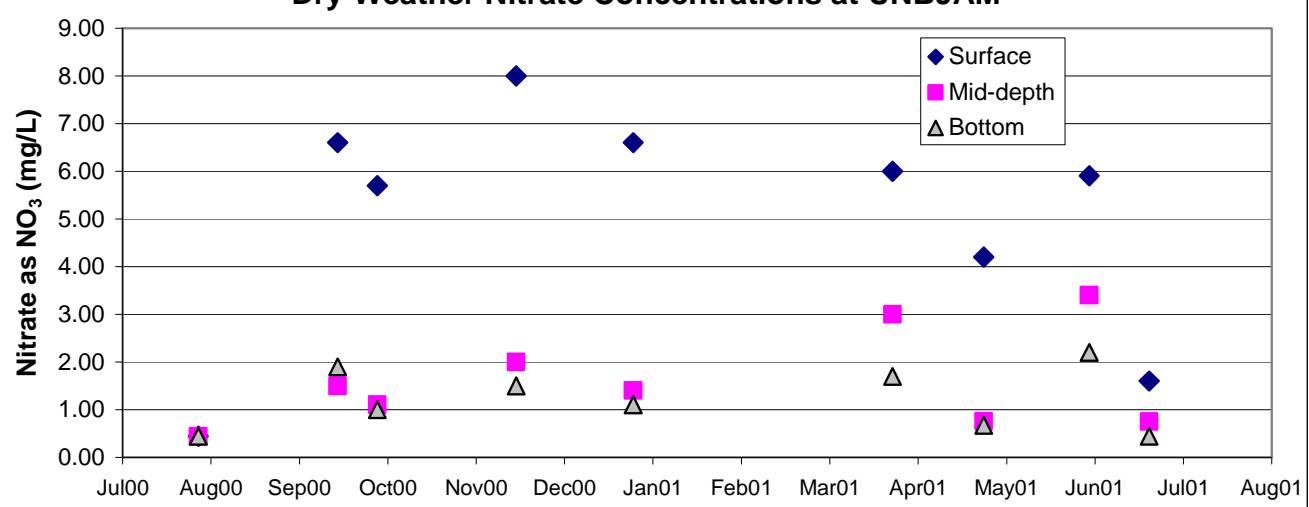


Figure 9
IRWD Hydrolab Data
Upper Newport Bay - August 1-16, 2000

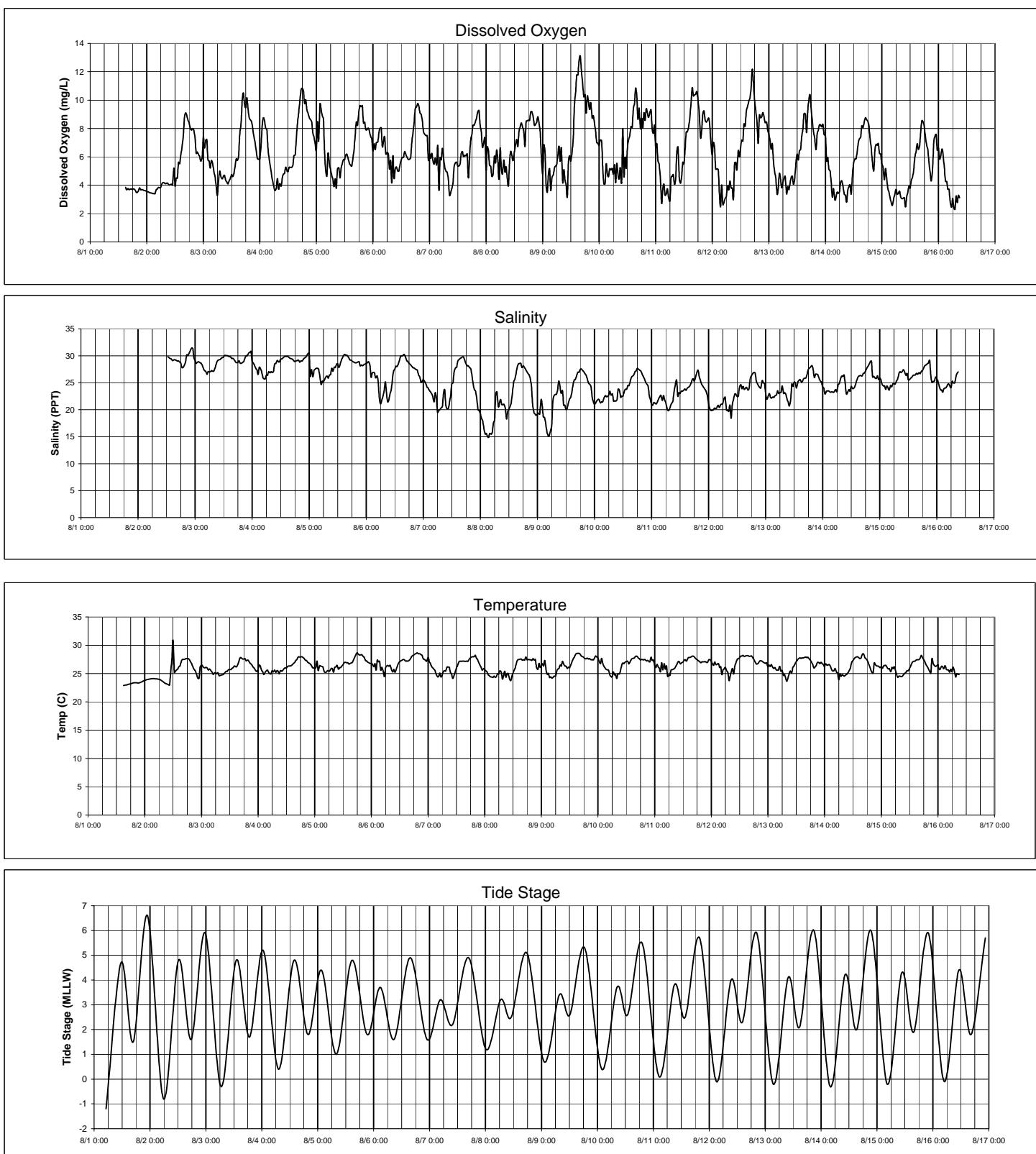
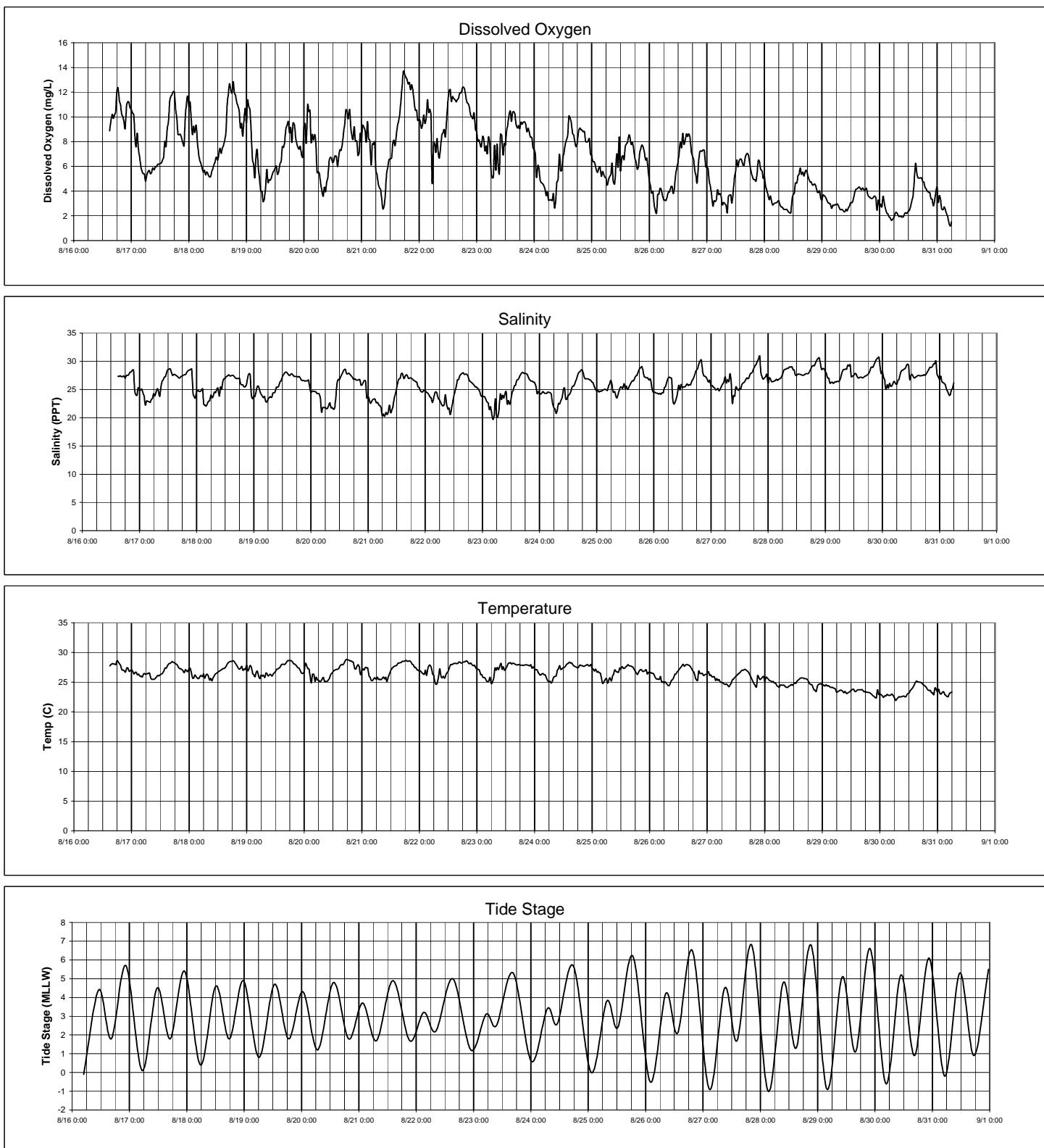


Figure 10
IRWD Hydrolab Data
Upper Newport Bay - August 16 -31, 2000



Appendix A
A Regional Nutrient Monitoring Program
for the Newport Bay Watershed - RWQCB Staff Report

A REGIONAL NUTRIENT MONITORING PROGRAM FOR THE NEWPORT BAY WATERSHED

INTRODUCTION

The Nutrient TMDL for the Newport Bay/San Diego Creek Watershed (Resolution No. 98-9, as amended by Resolution No. 98-100) requires that the Santa Ana Regional Water Quality Control Board establish and oversee a regional monitoring program (RMP) for the Newport Bay watershed. The RMP is a coordinated program to assess the attainment of the goals of the nutrient TMDL. The objectives of the monitoring program are to quantify the three endpoints of the nutrient TMDL: 1) the seasonal nutrient loading from the watershed; 2) the nutrient concentration in San Diego Creek, Reaches 1 and 2; and 3) the extent, magnitude, and duration of algal blooms in San Diego Creek and Newport Bay.

BACKGROUND

The RMP is intended to eliminate the redundancies in monitoring occurring in the Newport Bay watershed. The RMP is intended to allow all dischargers in the watershed to participate. Participation in the RMP could result in the reduction of self-monitoring requirements contained in individual Waste Discharge Requirements (WDRs) or National Pollution Discharge Elimination System (NPDES) permits.

The RMP is composed of two components: a routine monitoring component and a special monitoring component. The routine monitoring includes most of the traditional monitoring that has occurred in the watershed. The special monitoring includes special investigations into unanswered questions about nutrient sources and dynamics in the watershed.

While the RMP was originally conceived as focusing only on nutrients, the Newport Bay Watershed Water Quality Technical Workgroup has also recognized the utility of using the RMP as a framework for additional monitoring in the watershed. This is an appropriate extension of the program considering the current development of a toxic substances TMDL for the Newport Watershed by the Regional Board for adoption in 2002. Specifically, monitoring for toxic substances and toxicity would be conducted at the same sites in the Bay and watershed. A proposed toxic substances monitoring plan is included in Appendix A.

PROCEDURES AND QUALITY ASSURANCE/QUALITY CONTROL

Sampling procedures and quality assurance/quality control will follow those outlined in County of Orange, 1998b. If more than one entity or laboratory is collecting or analyzing samples, a standard sampling procedure, quality assurance/quality control, and analysis procedure will need to be developed. Additional sampling procedures and quality assurance/quality control protocols will need to be developed for algae sampling.

RATIONALE FOR STATION SELECTION

TMDL Compliance Monitoring

Compliance monitoring will quantify the three endpoints of the nutrient TMDL. The seasonal nutrient loading from the watershed will be determined from samples collected at the San Diego Creek at Campus, Santa Ana-Delhi at Irvine Ave., Bonita Canyon at San Diego Creek, and Costa Mesa Channel at Highland stations. These station locations will capture 99% of the total annual nitrogen load in the watershed based on analyses conducted during the development of the TMDL. The remaining 1% of the total annual nitrogen load, coming from the Lower Newport Bay watershed, will be determined by modeling land use and loading rates.

The nutrient concentration in San Diego Creek, Reaches 1 and 2, will be determined from samples collected at the San Diego Creek at Campus and San Diego Creek at Culver stations. These are the historical stations used to determine the concentrations in the Creek.

The extent, magnitude, and duration of algal blooms in San Diego Creek and Newport Bay will be determined by the in-bay algae and water quality monitoring program and an algae survey of the creek system.

TMDL Allocation Monitoring

Allocation monitoring will quantify the allocations of the nutrient TMDL. The currently permitted and unpermitted nurseries will sample discharges from their facilities. The agricultural discharges will be characterized by sampling stations located in three general soil zones and for different crop types. These sites are yet to be determined.

The urban allocation will be determined from samples collected at the Santa Ana-Delhi at Irvine Ave., Costa Mesa Channel at Highland, Lane Channel at Jamboree, El Modena-Irvine Channel at Michelle, and Agua Chinon Wash at Irvine Center Dr. stations.

ROUTINE MONITORING

Physicals/Nutrients

The selection of monitoring locations relied upon the historical location of monitoring stations maintained by the County of Orange, analysis of the current NPDES monitoring program (County of Orange, 1998a) and proposed revisions to that program (County of Orange, 1998b), the data used to develop the nutrient TMDL, and areas of information that were missing in the development of the TMDL.

Watershed

The watershed monitoring plan serves two of the three goals of the nutrient TMDL as well as providing compliance monitoring with TMDL load and wasteload allocations. The stations were selected based on the three main land uses associated with allocations: urban, nurseries, and agriculture. The station locations include nine stations previously monitored by the County of Orange, the three permitted nursery stations, and additional stations to be added for currently unpermitted nurseries and agricultural sites. The sites and constituents to be sampled are listed in Table 1.

In-Bay

The in-bay monitoring plan serves to address a component of the third endpoint of the TMDL, algal blooms in the Bay. The five stations are a reduction from the ten that are currently monitored by the County of Orange. The five stations are representative of the Bay based on the analysis conducted by the County of Orange (County of Orange, 1998a). The stations and constituents to be sampled are listed in Table 2.

Algae

The third endpoint of the TMDL is to determine the extent, magnitude, and duration of algal blooms in San Diego Creek and Newport Bay. The monitoring stations selected are representative sites from the stations established by Dr. Horne for the IRWD WWSP. (Alex Horne Associates, 1998). The 9 sites are distributed throughout the Upper Bay. Algae distribution in the creek system is a special monitoring priority (see next section). The stations and parameters are listed in Table 3.

SPECIAL MONITORING

Several areas and problems within the watershed need further intensive study in order to provide information to update and revise the nutrient TMDL, if necessary. The studies range from short duration, focused investigations into the nutrient loading from open space in the watershed to longer, more complex investigations, such as nutrients concentrations in Bay and Creek sediments and shallow groundwater loading to the creek system. A few of these studies would be performed each year. The monitoring priorities (not in order of priority) are:

- Aerial mapping of algae distribution
- Open space nutrient loading
- Shallow groundwater contribution to the creek system
- Algae survey of the creek system
- Nutrient concentrations in bay and creek sediments
- Quantification of beneficial use impairment of the bay
- Nutrient fluxes from bay sediments and algae
- Quantification of precipitation loading

REFERENCES

- Alex Horne Associates, 1998. Macroalgae (Seaweed) in Newport Bay-Estuaries: Spring-Summer-Fall 1998 and a comparison with 1996-97. Report to the Irvine Ranch Water District. 27p.
- County of Orange, Public Facilities and Resources Dept., 1998a. Monitoring Program Design. Report prepared for the San Diego and Santa Ana Regional Water Quality Control Boards. 36p.
- County of Orange, Public Facilities and Resources Dept., 1998b. Water Quality Sampling Plan. Report prepared for the San Diego and Santa Ana Regional Water Quality Control Boards. 10p + appendices.

Table #1 Newport Bay Watershed Monitoring

STATION	ANALYSIS	CONSTITUENTS	FREQUENCY	ANNUAL FREQUENCY	SAMPLES PER STATION	ANNUAL SAMPLES PER STATION
SADF01 Santa Ana-Delhi	Physicals	temp, conductivity, turbidity, Ph, DO, hardness	Bi-monthly	24	1	24
@ Irvine Ave	Nutrients	TN (nitrate, nitrite, ammonia, kjeldahl), TP(ortho)	Bi-monthly	24	1	24
	Physicals	flow	Daily	NA	NA	NA
	Physicals	temp, conductivity, turbidity, Ph, DO, hardness	Storm	3 minimum	1	3 minimum
	Nutrients	TN (nitrate, nitrite, ammonia, kjeldahl), TP(ortho)	Storm	3 minimum	1	3 minimum
SDMF05 San Diego Creek	Physicals	temp, conductivity, turbidity, Ph, DO, hardness	Weekly	52	1	52
@ Campus	Nutrients	TN (nitrate, nitrite, ammonia, kjeldahl), TP(ortho)	Weekly	52	1	52
	Physicals	flow	Daily	NA	NA	NA
	Physicals	temp, conductivity, turbidity, Ph, DO, hardness	Storm	3 minimum	1	3 minimum
	Nutrients	TN (nitrate, nitrite, ammonia, kjeldahl), TP(ortho)	Storm	3 minimum	1	3 minimum
BCF04 Bonita Canyon	Physicals	temp, conductivity, turbidity, Ph, DO, hardness, flow	Monthly	12	1	12
@ SDC	Nutrients	TN (nitrate, nitrite, ammonia, kjeldahl), TP(ortho)	Monthly	12	1	12
	Physicals	temp, conductivity, turbidity, Ph, DO, hardness, flow	Storm	3 minimum	1	3 minimum
	Nutrients	TN (nitrate, nitrite, ammonia, kjeldahl), TP(ortho)	Storm	3 minimum	1	3 minimum
CMCG02 Costa Mesa Channel	Physicals	temp, conductivity, turbidity, Ph, DO, hardness, flow	Monthly	12	1	12
@ Highland	Nutrients	TN (nitrate, nitrite, ammonia, kjeldahl), TP(ortho)	Monthly	12	1	12
	Physicals	temp, conductivity, turbidity, Ph, DO, hardness, flow	Storm	3 minimum	1	3 minimum
	Nutrients	TN (nitrate, nitrite, ammonia, kjeldahl), TP(ortho)	Storm	3 minimum	1	3 minimum

Table #1 Newport Bay Watershed Monitoring

STATION	ANALYSIS	CONSTITUENTS	FREQUENCY	ANNUAL FREQUENCY	SAMPLES PER STATION	ANNUAL SAMPLES PER STATION
MIRF07 El Modena-Irvine Channel	Physicals	temp, conductivity, turbidity, Ph, DO, hardness, flow	Monthly	12	1	12
	Nutrients	TN (nitrate, nitrite, ammonia, kjeldahl), TP(ortho)	Monthly	12	1	12
	Physicals	temp, conductivity, turbidity, Ph, DO, hardness, flow	Storm	3 minimum	1	3 minimum
	Nutrients	TN (nitrate, nitrite, ammonia, kjeldahl), TP(ortho)	Storm	3 minimum	1	3 minimum
LANF08 Lane Channel	Physicals	temp, conductivity, turbidity, Ph, DO, hardness, flow	Monthly	12	1	12
	Nutrients	TN (nitrate, nitrite, ammonia, kjeldahl), TP(ortho)	Monthly	12	1	12
	Physicals	temp, conductivity, turbidity, Ph, DO, hardness, flow	Storm	3 minimum	1	3 minimum
	Nutrients	TN (nitrate, nitrite, ammonia, kjeldahl), TP(ortho)	Storm	3 minimum	1	3 minimum
ACWF18 Agua Chinon Wash	Physicals	temp, conductivity, turbidity, Ph, DO, hardness, flow	Monthly	12	1	12
	Nutrients	TN (nitrate, nitrite, ammonia, kjeldahl), TP(ortho)	Monthly	12	1	12
	Physicals	temp, conductivity, turbidity, Ph, DO, hardness, flow	Storm	3 minimum	1	3 minimum
	Nutrients	TN (nitrate, nitrite, ammonia, kjeldahl), TP(ortho)	Storm	3 minimum	1	3 minimum
BARSED Peters Canyon Wash	Physicals	temp, conductivity, turbidity, Ph, DO, hardness	Bi-monthly	24	1	24
	Nutrients	TN (nitrate, nitrite, ammonia, kjeldahl), TP(ortho)	Bi-monthly	24	1	24
	Physicals	flow	Daily	NA	NA	NA
	Physicals	temp, conductivity, turbidity, Ph, DO, hardness	Storm	3 minimum	1	3 minimum
@ Barranca	Nutrients	TN (nitrate, nitrite, ammonia, kjeldahl), TP(ortho)	Storm	3 minimum	1	3 minimum

Table #1 Newport Bay Watershed Monitoring

STATION	ANALYSIS	CONSTITUENTS	FREQUENCY	ANNUAL FREQUENCY	SAMPLES PER STATION	ANNUAL SAMPLES PER STATION
WYLED San Diego Creek	Physicals	temp, conductivity, turbidity, Ph, DO, hardness	Bi-monthly	24	1	24
@ Culver	Nutrients	TN (nitrate, nitrite, ammonia, kjeldahl), TP(ortho)	Bi-monthly	24	1	24
	Physicals	flow	Daily	NA	NA	NA
	Physicals	temp, conductivity, turbidity, Ph, DO, hardness	Storm	3 minimum	1	3 minimum
	Nutrients	TN (nitrate, nitrite, ammonia, kjeldahl), TP(ortho)	Storm	3 minimum	1	3 minimum
Currently permitted nurseries Hines, El Modeno, Bordiers	Physicals	temp, conductivity, turbidity, Ph, DO, hardness	Weekly	52	1	52
	Physicals	Flow	Daily	NA	NA	NA
	Nutrients	TN (nitrate, nitrite, ammonia, kjeldahl), TP(ortho)	Weekly	52	1	52
Currently unpermitted nurseries (Possibly 1 to 10)	Physicals	temp, conductivity, turbidity, Ph, DO, hardness	Weekly	52	1	52
	Flow	Flow	Daily	NA	NA	NA
	Nutrients	TN (nitrate, nitrite, ammonia, kjeldahl), TP(ortho)	Weekly	52	1	52
Agricultural discharges (Sites to be determined)	Physicals	temp, conductivity, turbidity, Ph, DO, hardness	Irrigation/Storm	NA	NA	NA
	Flow	Flow	Daily	NA	NA	NA
	Nutrients	TN (nitrate, nitrite, ammonia, kjeldahl), TP(ortho)	Irrigation/Storm	NA	NA	NA

Table # 2 Newport Bay Monitoring

STATION	ANALYSIS	CONSTITUENTS	FREQUENCY	ANNUAL FREQUENCY	SAMPLES PER STATION	ANNUAL SAMPLES PER STATION
UNBJAM	Physicals	temp, conductivity, turbidity, Ph, DO	Monthly	12	3 (1 @ 3 depths)	36
	Nutrients	TN (nitrate, nitrite, ammonia, kjeldahl), TP(ortho)	Monthly	12	3 (1 @ 3 depths)	36
UNBSDC	Physicals	temp, conductivity, turbidity, Ph, DO	Monthly	12	3 (1 @ 3 depths)	36
	Nutrients	TN (nitrate, nitrite, ammonia, kjeldahl), TP(ortho)	Monthly	12	3 (1 @ 3 depths)	36
UNBNSB	Physicals	temp, conductivity, turbidity, Ph, DO	Monthly	12	3 (1 @ 3 depths)	36
	Nutrients	TN (nitrate, nitrite, ammonia, kjeldahl), TP(ortho)	Monthly	12	3 (1 @ 3 depths)	36
UNBCHB	Physicals	temp, conductivity, turbidity, Ph, DO	Monthly	12	3 (1 @ 3 depths)	36
	Nutrients	TN (nitrate, nitrite, ammonia, kjeldahl), TP(ortho)	Monthly	12	3 (1 @ 3 depths)	36
LNBHIR	Physicals	temp, conductivity, turbidity, Ph, DO	Monthly	12	3 (1 @ 3 depths)	36
	Nutrients	TN (nitrate, nitrite, ammonia, kjeldahl), TP(ortho)	Monthly	12	3 (1 @ 3 depths)	36

Table # 3 Newport Bay Algae Monitoring

STATION	ANALYSIS	CONSTITUENTS	FREQUENCY	ANNUAL FREQUENCY	SAMPLES PER STATION	ANNUAL SAMPLES PER STATION
Horne # 2 (South end of Shellmaker Is)	Physicals	temp, DO, conductivity	Monthly during season/Bi-monthly off season	9	1	9
	Nutrients	TN (nitrate, nitrite, ammonia, kjeldahl), TP(ortho)	Monthly during season/Bi-monthly off season	9	1	9
	Algae	biomass, species composition	Monthly during season/Bi-monthly off season	9	transect	9
Horne # 4 (South tip of Middle Is)	Physicals	temp, DO, conductivity	Monthly during season/Bi-monthly off season	9	1	9
	Nutrients	TN (nitrate, nitrite, ammonia, kjeldahl), TP(ortho)	Monthly during season/Bi-monthly off season	9	1	9
	Algae	biomass, species composition	Monthly during season/Bi-monthly off season	9	transect	9
Horne # 8 (N end of Middle Is)	Physicals	temp, DO, conductivity	Monthly during season/Bi-monthly off season	9	1	9
	Nutrients	TN (nitrate, nitrite, ammonia, kjeldahl), TP(ortho)	Monthly during season/Bi-monthly off season	9	1	9
	Algae	biomass, species composition	Monthly during season/Bi-monthly off season	9	transect	9
Horne # 10 (W side of the Narrows)	Physicals	temp, DO, conductivity	Monthly during season/Bi-monthly off season	9	1	9
	Nutrients	TN (nitrate, nitrite, ammonia, kjeldahl), TP(ortho)	Monthly during season/Bi-monthly off season	9	1	9
	Algae	biomass, species composition	Monthly during season/Bi-monthly off season	9	transect	9

Table # 3 Newport Bay Algae Monitoring

STATION	ANALYSIS	CONSTITUENTS	FREQUENCY	ANNUAL FREQUENCY	SAMPLES PER STATION	ANNUAL SAMPLES PER STATION
Horne # 12 (SW side of Unit II Basin)	Physicals	temp, DO, conductivity	Monthly during season/Bi-monthly off season	9	1	9
	Nutrients	TN (nitrate, nitrite, ammonia, kjeldahl), TP(ortho)	Monthly during season/Bi-monthly off season	9	1	9
	Algae	biomass, species composition	Monthly during season/Bi-monthly off season	9	transect	9
Horne # 15 (N end of Unit II Basin, W side of Dike)	Physicals	temp, DO, conductivity	Monthly during season/Bi-monthly off season	9	1	9
	Nutrients	TN (nitrate, nitrite, ammonia, kjeldahl), TP(ortho)	Monthly during season/Bi-monthly off season	9	1	9
	Algae	biomass, species composition	Monthly during season/Bi-monthly off season	9	transect	9
Horne # 18 (S side of Unit I Basin)	Physicals	temp, DO, conductivity	Monthly during season/Bi-monthly off season	9	1	9
	Nutrients	TN (nitrate, nitrite, ammonia, kjeldahl), TP(ortho)	Monthly during season/Bi-monthly off season	9	1	9
	Algae	biomass, species composition	Monthly during season/Bi-monthly off season	9	transect	9
Horne # 19 (N side of Unit I Basin)	Physicals	temp, DO, conductivity	Monthly during season/Bi-monthly off season	9	1	9
	Nutrients	TN (nitrate, nitrite, ammonia, kjeldahl), TP(ortho)	Monthly during season/Bi-monthly off season	9	1	9
	Algae	biomass, species composition	Monthly during season/Bi-monthly off season	9	transect	9
Horne #24 (NE side of Unit I Basin)	Physicals	temp, DO, conductivity	Monthly during season/Bi-monthly off season	9	1	9
	Nutrients	TN (nitrate, nitrite, ammonia, kjeldahl), TP(ortho)	Monthly during season/Bi-monthly off season	9	1	9
	Algae	biomass, species composition	Monthly during season/Bi-monthly off season	9	transect	9

APPENDIX A - Newport Bay Watershed Toxic Substances Monitoring

STATION	ANALYSIS	CONSTITUENTS	FREQUENCY	ANNUAL FREQUENCY	SAMPLES PER STATION	ANNUAL SAMPLES PER STATION
SDMF01	Metals	Cadmium, Chromium, Copper, Lead, Mercury, Selenium, Silver, Zinc	Seasonally (Wet/dry)	12	1	12
Santa Ana-Delhi						
@ Irvine Ave	Organophosphate Pesticides	Diazinon, Chlorpyrifos	Seasonally (Wet/dry)	12	1	12
	Sediment	Trace Metals, DDT, Chlordane, Toxaphene	Semi-Annually	2	1	2
	Acute Toxicity - water column		Seasonally (Wet/dry)	4	1	4
	Chronic Toxicity - (Ceriodaphnia/Pimephales) water column		Seasonally (Wet/dry)	8	1	8
SDMF05	Metals	Cadmium, Chromium, Copper, Lead, Mercury, Selenium, Silver, Zinc	Seasonally (Wet/dry)	12	1	12
San Diego Creek						
@ Campus	Organophosphate Pesticides	Diazinon, Chlorpyrifos	Seasonally (Wet/dry)	12	1	12
	Sediment	Trace Metals, DDT, Chlordane, Toxaphene	Semi-Annually	2	1	2
	Acute Toxicity - water column		Seasonally (Wet/dry)	4	1	4
	Chronic Toxicity - (Ceriodaphnia/Pimephales) water column		Seasonally (Wet/dry)	8	1	8
BCF04	Metals	Cadmium, Chromium, Copper, Lead, Mercury, Selenium, Silver, Zinc	Seasonally (Wet/dry)	6	1	6
Bonita Canyon						
@ SDC	Organophosphate Pesticides	Diazinon, Chlorpyrifos	Seasonally (Wet/dry)	6	1	6
	Sediment	Trace Metals, DDT, Chlordane, Toxaphene	Semi-Annually	2	1	2
	Acute Toxicity - water column		Seasonally (Wet/dry)	4	1	4
	Chronic Toxicity - (Ceriodaphnia/Pimephales) water column		Seasonally (Wet/dry)	8	1	8

APPENDIX A - Newport Bay Watershed Toxic Substances Monitoring

STATION	ANALYSIS	CONSTITUENTS	FREQUENCY	ANNUAL FREQUENCY	SAMPLES PER STATION	ANNUAL SAMPLES PER STATION
CMCG02	Metals	Cadmium, Chromium, Copper, Lead, Mercury, Selenium, Silver, Zinc	Seasonally (Wet/dry)	6	1	6
Costa Mesa Channel						
@ Highland	Organophosphate Pesticides	Diazinon, Chlorpyrifos	Seasonally (Wet/dry)	6	1	6
	Acute Toxicity - water column		Seasonally (Wet/dry)	4	1	4
	Chronic Toxicity - (Ceriodaphnia/Pimephales) water column		Seasonally (Wet/dry)	8	1	8
MICF07	Metals	Cadmium, Chromium, Copper, Lead, Mercury, Selenium, Silver, Zinc	Seasonally (Wet/dry)	6	1	6
El Modena-Irvine Channel						
@ Michelle	Organophosphate Pesticides	Diazinon, Chlorpyrifos	Seasonally (Wet/dry)	6	1	6
	Acute Toxicity - water column		Seasonally (Wet/dry)	4	1	4
	Chronic Toxicity - (Ceriodaphnia/Pimephales) water column		Seasonally (Wet/dry)	8	1	8
LANF08	Metals	Cadmium, Chromium, Copper, Lead, Mercury, Selenium, Silver, Zinc	Seasonally (Wet/dry)	6	1	6
Lane Channel						
@ Jamboree	Organophosphate Pesticides	Diazinon, Chlorpyrifos	Seasonally (Wet/dry)	6	1	6
	Sediment	Trace Metals, DDT, Chlordane, Toxaphene	Semi-Annually	2	1	2
	Acute Toxicity - water column		Seasonally (Wet/dry)	4	1	4
	Chronic Toxicity - (Ceriodaphnia/Pimephales) water column		Seasonally (Wet/dry)	8	1	8

APPENDIX A - Newport Bay Watershed Toxic Substances Monitoring

STATION	ANALYSIS	CONSTITUENTS	FREQUENCY	ANNUAL FREQUENCY	SAMPLES PER STATION	ANNUAL SAMPLES PER STATION
ACWF18	Metals	Cadmium, Chromium, Copper, Lead, Mercury, Selenium, Silver, Zinc	Seasonally (Wet/dry)	6	1	6
Agua Chinon Wash						
@ Irvine Center Dr.	Organophosphate Pesticides	Diazinon, Chlorpyrifos	Seasonally (Wet/dry)	6	1	6
	Sediment	Trace Metals, DDT, Chlordane, Toxaphene	Semi-Annually	2	1	2
	Acute Toxicity - water column		Seasonally (Wet/dry)	4	1	4
	Chronic Toxicity - (Ceriodaphnia/Pimephales) water column		Seasonally (Wet/dry)	8	1	8
BARSED	Metals	Cadmium, Chromium, Copper, Lead, Mercury, Selenium, Silver, Zinc	Seasonally (Wet/dry)	12	1	12
Peters Canyon Wash						
@ Barranca	Organophosphate Pesticides	Diazinon, Chlorpyrifos	Seasonally (Wet/dry)	12	1	12
	Sediment	Trace Metals, DDT, Chlordane, Toxaphene	Semi-Annually	2	1	2
	Acute Toxicity - water column		Seasonally (Wet/dry)	4	1	4
	Chronic Toxicity - (Ceriodaphnia/Pimephales) water column		Seasonally (Wet/dry)	8	1	8
WYLSED	Metals	Cadmium, Chromium, Copper, Lead, Mercury, Selenium, Silver, Zinc	Seasonally (Wet/dry)	12	1	12
San Diego Creek						
@ Culver	Organophosphate Pesticides	Diazinon, Chlorpyrifos	Seasonally (Wet/dry)	12	1	12
	Sediment	Trace Metals, DDT, Chlordane, Toxaphene	Semi-Annually	2	1	2
	Acute Toxicity - water column		Seasonally (Wet/dry)	4	1	4
	Chronic Toxicity - (Ceriodaphnia/Pimephales) water column		Seasonally (Wet/dry)	8	1	8

APPENDIX A - Newport Bay Watershed Toxic Substances Monitoring

STATION	ANALYSIS	CONSTITUENTS	FREQUENCY	ANNUAL FREQUENCY	SAMPLES PER STATION	ANNUAL SAMPLES PER STATION
Currently permitted nurseries	Priority Pesticides	Chlordane, DDT, Endosulfan, Toxaphene, PCB, etc.	Bi-annually	2	1	2
Hines, El Modeno, Bordiers	Organophosphate Pesticides	Diazinon, Chlorpyrifos	Seasonally (Wet/dry)	4	1	4
	Chronic Toxicity		Bi-annually	2	1	2
Currently unpermitted nurseries	Priority Pesticides	Chlordane, DDT, Endosulfan, Toxaphene, PCB, etc.	Bi-annually	2	1	2
(Possibly 1 to 10)	Organophosphate Pesticides	Diazinon, Chlorpyrifos	Seasonally (Wet/dry)	4	1	4
	Chronic Toxicity		Bi-annually	2	1	2
Agricultural discharges	Priority Pesticides	Chlordane, DDT, Endosulfan, Toxaphene, PCB, etc.	Bi-annually	2	1	2
(Sites to be determined)	Organophosphate Pesticides	Diazinon, Chlorpyrifos	Seasonally (Wet/dry)	4	1	4
	Chronic Toxicity		Bi-annually	2	1	2

APPENDIX A - Newport Bay Toxic Substances Monitoring

STATION	ANALYSIS	CONSTITUENTS	FREQUENCY	ANNUAL FREQUENCY	SAMPLES PER STATION	ANNUAL SAMPLES PER STATION
UNBJAM	Metals	Cadmium, Chromium, Copper, Lead, Mercury, Selenium, Silver, Zinc	Seasonally (Wet/dry)	4	3 (1 @ 3 depths)	12
	Organophosphate Pesticides	Diazinon, Chlorpyrifos	Seasonally (Wet/dry)	4	3 (1 @ 3 depths)	12
	Sediment	Trace Metals, DDT, Chlordane	Semi-Annually	2	1	2
	Acute Toxicity - (Mysids) water column		Seasonally (Wet/dry)	4	1	4
	Chronic Toxicity - (Mysids) water column		Seasonally (Wet/dry)	4	1	4
UNBSDC	Metals	Cadmium, Chromium, Copper, Lead, Mercury, Selenium, Silver, Zinc	Seasonally (Wet/dry)	4	3 (1 @ 3 depths)	12
	Organophosphate Pesticides	Diazinon, Chlorpyrifos	Seasonally (Wet/dry)	4	3 (1 @ 3 depths)	12
	Sediment	Trace Metals, DDT, Chlordane	Semi-Annually	2	1	2
	Acute Toxicity - (Mysids) water column		Seasonally (Wet/dry)	4	1	4
	Chronic Toxicity - (Mysids) water column		Seasonally (Wet/dry)	4	1	4
UNBNSB	Metals	Cadmium, Chromium, Copper, Lead, Mercury, Selenium, Silver, Zinc	Seasonally (Wet/dry)	4	3 (1 @ 3 depths)	12
	Organophosphate Pesticides	Diazinon, Chlorpyrifos	Seasonally (Wet/dry)	4	3 (1 @ 3 depths)	12
	Sediment	Trace Metals, DDT, Chlordane	Semi-Annually	2	1	2
	Acute Toxicity - (Mysids) water column		Seasonally (Wet/dry)	4	1	4
	Chronic Toxicity - (Mysids) water column		Seasonally (Wet/dry)	4	1	4

APPENDIX A - Newport Bay Toxic Substances Monitoring

STATION	ANALYSIS	CONSTITUENTS	FREQUENCY	ANNUAL FREQUENCY	SAMPLES PER STATION	ANNUAL SAMPLES PER STATION
UNBCHB	Metals	Cadmium, Chromium, Copper, Lead, Mercury, Selenium, Silver, Zinc	Seasonally (Wet/dry)	4	3 (1 @ 3 depths)	12
	Organophosphate Pesticides	Diazinon, Chloryrifos	Seasonally (Wet/dry)	4	3 (1 @ 3 depths)	12
	Sediment	Trace Metals, DDT, Chlordane	Semi-Annually	2	1	2
	Acute Toxicity - (Mysids) water column		Seasonally (Wet/dry)	4	1	4
	Chronic Toxicity - (Mysids) water column		Seasonally (Wet/dry)	4	1	4
LNBHIR	Metals	Cadmium, Chromium, Copper, Lead, Mercury, Selenium, Silver, Zinc	Seasonally (Wet/dry)	4	3 (1 @ 3 depths)	12
	Organophosphate Pesticides	Diazinon, Chloryrifos	Seasonally (Wet/dry)	4	3 (1 @ 3 depths)	12
	Sediment	Trace Metals, DDT, Chlordane	Semi-Annually	2	1	2
	Acute Toxicity - (Mysids) water column		Seasonally (Wet/dry)	4	1	4
	Chronic Toxicity - (Mysids) water column		Seasonally (Wet/dry)	4	1	4
LNBRIN	Metals	Trace Metals, TBT	Semi-annually	2	3 (1 @ 3 depths)	6
	Synthetic Organics	DDT, PCB	Semi-annually	2	3 (1 @ 3 depths)	6
	Sediment	Trace Metals, DDT, PCB, TBT	Annually	1	1	1
	Acute Toxicity - (Mysids) water column		Semi-annually	2	1	2
	Chronic Toxicity - (Mysids) water column		Semi-annually	2	1	2
	Chronic Toxicity - (Rhepoxygnus) sediment		Semi-annually	2	1	2

APPENDIX B - Budget

County NPDES Monitoring				RMP							
	turbidity, NO3, NH3, TKN, TP, TSS, VSS	flow	Temp, EC, pH, DO			TN(nitrate, nitrite, ammonia, TKN), TP	flow	Temp, EC, turbidity, pH, DO, hardness	Temp, DO, EC	Algae (biomass, species composition)	
SADF01		1	9		SADF01	33	1	33			
SDMF05	61	1	61		SDMF05	61	1	61			
BCF04			12		BCF04	21	1	21			
CMCG02	61	1	61		CMCG02	21	1	21			
MICF07		1			MICF07	21	1	21			
LANF08		1	10		LANF08	21	1	21			
ACWF18			2		ACWF18	15	1	15			
CICF25	20	1	20		BARSED	33	1	33			
RCWF26	20		20		WYLED	33	1	33			
HCWF27			2		UNBJAM	36		12			
HINF28	20		20		UNBSDC	36		12			
BARSED		1			UNBNSB	36		12			
WYLED	21	1	21		UNBCHB	36		12			
UNBJAM	18		18		LNBRIN	36		12			
UNBSDC	18		18		HORNE #2	9*			9*	9	
UNBNSB	18		18		HORNE #4	9*			9*	9	
UNBCHB	18		18		HORNE #8	9*			9*	9	
LNBRIN	5		5		HORNE #10	9*			9*	9	
LNBTRUB			6		HORNE #12	9*			9*	9	
LNBHIR			8		HORNE #15	9*			9*	9	
Total Analyses	280	8	329		HORNE #18	9*			9*	9	
Cost/Analysis	\$121	\$3,440	\$86		HORNE #19	9*			9*	9	
Totals	\$33,880	\$27,520	\$28,294	\$89,694	HORNE #24	9*			9*	9	
					Total Analyses	439	9	319	0	81	
					Cost/Analysis	\$121	\$3,440	\$86		\$284	
					Totals	\$53,119	\$30,960	\$27,434	\$0	\$23,004	\$134,517
						* Price included in Algal Survey 2 ERS II labor hours including burden factor and overhead 2 weeks of ERS II labor					

Recommended Toxic Substances Monitoring										
	Cr, Cu, Pb, Hg, Se, Zn	Seawater Cr, Cu, Pb, Hg, Se, Zn	OP Pesticides	Trace metals in Sediment	Organochlorine Pesticides in Sediment	TBT	Acute Toxicity (Ceriodaphnia, fathead minnow)	Chronic Toxicity (Ceriodaphnia, fathead minnow)	Acute Toxicity (Mysids)	Chronic Toxicity (Mysids)
SADF01	12		12	2	2		4	8		
SDMF05	12		12	2	2		4	8		
BCF04	6		6	2	2		4	8		
CMCG02	6		6				4	8		
MICF07	6		6				4	8		
LANF08	6		6	2	2		4	8		
ACWF18	6		6	2	2		4	8		
BARSED	12		12	2	2		4	8		
WYLSED	12		12	2	2		4	8		
UNBJAM		12	12	2	2				4	4
UNBSDC		12	12	2	2				4	4
UNBNSB		12	12	2	2				4	4
UNBCHB		12	12	2	2				4	4
LNBRIN		6	6	1	1	1			2	2
Total Analyses	78	54	132	23	23	1	36	72	18	18
Cost/Analysis	\$88	\$103	\$300	\$50	\$180		\$250	\$250	\$250	\$250
Totals	\$6,864	\$5,562	\$39,600	\$1,150	\$4,140	\$0	\$9,000	\$18,000	\$4,500	\$4,500
								2 ERS II labor hours including burden factor and overhead		
								2 weeks of ERS II labor		

County NPDES Monitoring

	Diss & Total Ag, Cd, Cr, Cu, Ni, Pb, Zn, hardness	Diss & Total Seawater Ag, Cd, Cr, Cu, Ni, Pb, Zn	Trace metals in Sediment	PCBs, Organochlorine Pesticides in Sediment					
SADF01	9								
SDMF05	9		2	2					
BCF04	12		2	2					
CMCG02	61								
MICF07									
LANF08									
ACWF18				2					
CICF25									
RCWF26									
HCWF27				2					
HINF28									
BARSED									
WYLED			2	2					
UNBJAM		6	2	2					
UNBSDC		6	2	2					
UNBNSB		6							
UNBCHB		6							
LNBRIN		6	5	2					
LNBTRUB		6	2	2					
LNBHIR		8	2	2					
Total Analyses	182	88	19	20					
Cost/Analysis	\$60	\$75	\$50	\$180					
Totals	\$10,920	\$6,600	\$950	\$3,600	\$22,070				

Appendix B
Newport Bay Watershed Monitoring Data

RMP WATERSHED SITES
Agua Chinon Wash

STATION	DATE	TIME	SAMPLES		EC mmhos	Turb NTU	pH	NO3 mg/L	NH3 mg/L	TKN mg/L	PO4 mg/L	o-PO4 mg/L	TSS mg/L	VSS mg/L	Field Measurements		EC mmhos	pH C	TEMP C	DO mg/L
			Type	#											Date	Time				
ACWF18	7/25/00	12:20	DT	1	1340	2.5	8	16	<0.05	1	2.59	0.737	<10	<1	7/25/00	12:20	1500	7.1	24.9	7.4
	8/30/00	10:05	DT	1	1130	2.6	7.9	17	0.065	0.69	1.93	0.57	<10	<10	8/30/00	10:05	1430	7	23.2	6.3
	9/8/00	12:15	DT	1	1760	1.7	8.8	22	<0.05	0.76	1.87	0.402	<10	<10	9/8/00	12:15	1400	6.9	24.3	6.5
	11/8/00	10:00	DT	1	1830	145	7.7	53	0.166	2.2	2.88	0.426	180	23						
	11/30/00	15:30	DT	1	1740	6.3	7.7	39	<0.05	0.39	1.84	0.489	<10	<10	11/30/00	15:30	1090	8	14.9	8.9
	12/8/00	10:30	DT	1	1650	6.7	7.8	31	0.242	0.78	4.28	0.977	<10	<10	36868	0.4375	1110	8.1	16	9
	1/3/01	9:00	DT	1	1580	4.8	8	28	<0.05	0.71	3.06	0.697	12	<10	1/3/01	9:00	1212	7	15.1	8
	1/18/01	7:10	DT	1	1840	5.9	7.7	40	<0.05	0.75	2.3	0.435	<10	<10	36909	0.29861111	813	7	6	15.6
	2/13/01		ST	1	412	2210	8.8	13	0.175	5	7.04	4620	420							
	2/13/01		SF																	
	3/27/01	10:00	DT	1	1760	29	7.9	40	0.066	1.3	2.57	0.738	40	<10	3/27/01	10:00	1757	7.8	20.8	9.13
	4/18/01		DT	24	1640	40	8.1	38	<0.05	1.1	1.96	0.511	110	14						
	4/19/01																			
	6/20/01	8:50	DT	24	895	75	8.3	5.5	<0.05	1.6	4.9	1.78	110	15						
	6/21/01	7:50																		

RMP WATERSHED SITES
Peters Canyon Wash at Barranca Parkway

STATION	DATE	TIME	SAMPLES		EC mmhos	Turb NTU	pH	NO ₃ mg/L	NH ₃ mg/L	TKN mg/L	PO ₄ mg/L	o-PO ₄ mg/L	TSS mg/L	VSS mg/L	Field Measurements		EC mmhos	pH	TEMP C	DO mg/L
			Type	#											Date	Time				
BARSED	7/19/00	9:30	DT	1	2530	10	8.6	40	<0.05	1.2	0.615	0.06	20	10	7/19/00	9:30	2610	8	29	11.3
	8/4/00	12:25	DT	1	2400	10	8.9	35	<0.05	0.99	0.581	0.102	23	8	8/4/00	12:25	2550	8.7	32.1	
	8/16/00	14:34	DT	24	2560	19	8.2	33	<0.05	1.5	0.673	0.084	30	<10	8/17/00	13:40	2670	8.4	33.3	
	8/17/00	13:34																		
	8/29/00	14:25	DT	24	1940	5.8	8.4	37	0.166	1.5	1.04	0.227	<10	<10	8/29/00	13:30	2240	8.1	28.3	22.4
	8/30/00	13:25																		
	9/12/00	11:32	DT	24	2410	7.4	8.4	33	<0.05	1.3	0.337	0.026	13	<10	9/13/00	8:55	2350	8.5	22.3	16.1
	9/13/00	10:32																		
	9/26/00	12:36	DT	24	2420	3.4	8.6	44	<0.05	0.78	1.1	0.196	10	<10	9/27/00	12:10	2320	8	33.6	
	9/27/00	11:36																		
	10/5/00	11:15	DT	24	2280	6	8.5	40	<0.05	0.94	0.918	0.149	25	<10	10/6/00	10:40	1790	7.9	20.2	6.7
	10/6/00	10:15																		
	10/10/00	9:28	ST	5	1120	34	7.5	38	0.908	12	3.67	0.15	290	80						
	10/10/00	10:28																		
	10/10/00	11:28	ST	12	1620	17	7.8	44	0.345	4.1	1.56	0.205	74	18						
	10/11/00	11:28	SF																	
	10/11/00	13:28	ST	38	2120	10	8.3	40	0.228	2.4	1.19	0.184	16	40						
	10/14/00	6:28	SF																	
	10/27/00	3:43	ST	5	1530	300	8.2	53	0.742	5.7	4.59	0.54	620	100						
	10/27/00	4:43																		
	10/27/00	6:43	ST	8	1120	700	7.5	32	0.409	3.2	3.98	0.546	430	60						
	10/27/00	20:43	SF																	
	10/27/00	22:43	ST	18	2390	18	8.2	57	0.233	1.7	1.77	0.44	25	<10	10/29/00	9:55	2200	7.96	19.4	8.9
	10/29/00	7:43	SF																	
	10/29/00	9:43	ST	5	2710	12	8.5	53	0.075	0.75	0.949	0.19	12	<10						
	10/29/00	17:43	SF																	
	10/29/00	19:43	ST	10	1070	137	7.8	25	0.209	2.1	2.51	0.489	190	29						
	10/30/00	13:43	SF																	
	10/30/00	15:43	ST	7	2290	20	8.3	44	0.138	1.1	0.979	0.352	19	<10						
	10/31/00	3:43	SF																	
	11/8/00	10:30	DT	1	2330	5.3	8.9	43	<0.05	1.5	0.306	0.22	18	<10						
	11/30/00	10:32	DT	24	2630	5	8.3	53	0.133	0.96	0.765	0.114	13	<10	12/1/00	8:35	1481	7.4	14.7	10.5
	12/1/00	9:32																		
	12/14/00	8:50	DT	24	2510	9.9	8.8	70	<0.05	1.6	1.1	0.215	37	11	12/15/00	9:30	1300	7.3	14.9	8.8
	12/15/00	7:50																		
	12/26/00	8:56	DT	24	2070	22	8.5	66	0.116	1.4	1.71	0.302	41	10						
	12/27/00	7:56																		
	1/8/01	14:35	ST	5	1260	2.6	7.6	44	1.42	5.1	3.67	0.449	<10	<10						
	1/8/01	15:35																		
	1/8/01	17:35	ST	8	810	170	7.7	20	1.13	6.5	4.28	0.311	600	110						
	1/9/01	7:35																		
	1/9/01																			
	1/10/01	14:26	ST		2190	160	8.2	48	<0.05	3.3	2.36	0.5	<10	48						
	1/10/01	16:26																		
	1/10/01	18:26	ST	21	455	270	7.8	16	0.266	2	3.06	0.44	300	40						
	1/12/01	12:26	SF																	
	1/17/01	7:10	DT	2	3280	6	8.1	84	<0.05	0.75	0.581	0.167	<10	<10	1/18/01	9:15	1100	7.2	7.9	10.3
	1/18/01	6:10																		

RMP WATERSHED SITES
Peters Canyon Wash at Barranca Parkway

STATION	DATE	TIME	SAMPLES		EC mmhos	Turb NTU	pH	NO ₃ mg/L	NH ₃ mg/L	TKN mg/L	PO ₄ mg/L	o-PO ₄ mg/L	TSS mg/L	VSS mg/L	Field Measurements		EC mmhos	pH	TEMP C	DO mg/L		
			Type	#											Date	Time						
BARSED	1/24/01	8:57	ST	5	930	283	7.9	25	0.792	5.5	2.75	0.242	430	76								
	1/24/01	9:57	SF																			
	1/24/01	11:57	ST	10	1430	104	8	44	0.508	2.3	1.93	0.372	110	16								
	1/25/01	5:57	SF																			
	1/25/01	7:57	ST	12	2950	9	7.8	84	0.111	0.47	0.887	0.269	<10	<10								
	1/26/01	5:57	SF																			
	1/26/01	7:57	ST	26	1860	128	8.2	57	0.33	0.94	1.59	0.281	170	22								
	1/28/01	9:57	SF																			
	2/1/01	9:22	DT	24	3510	3.5	8.2	84	<0.05	0.4	0.643	0.153	<10	<10								
	2/2/01	8:22																				
	2/14/01		ST	24	1070	73	7.8	21	0.155	1.5	1.65	0.356	67	<10	2/15/01		5576	7.8	12.4	10.1		
	2/15/01																					
	2/22/01	8:30	DT	24	5630	4	8.2	210	<0.05	0.71	0.612	0.026	<10	<10	2/22/01	8:30	2494	8.1	15	18.6		
	2/23/01	7:30																				
	3/6/01	2:56	ST	5	1130	170	7.4	30	0.136	2.2	1.93		240	37								
	3/6/01	3:56	SF																			
	3/6/01	5:56	ST	5	1180	260	7.4	33	0.11	1.8	2.17	0.214	330	40								
	3/6/01	13:56	SF																			
	3/6/01	15:56	ST	13	2940	31	8	97	0.168	1.3	0.857	0.219	22	<10								
	3/7/01	15:56	SF																			
	3/7/01	17:56	ST	30	3380	30	8.3	100	<0.05	1.1	0.979	0.23	45	<10								
	3/10/01	3:56	SF																			
	3/20/01	8:49	DT	24	3220	2.2	8.3	88	<0.05	0.75	0.153	0.041	<10	<10	3/20/01	10:30	2950	8.2	19	19.9		
	3/21/01	7:49																				
	4/3/01		DT	24	2670	12	8.2	97	0.757	2.6	1.41	0.409	48	15								
	4/4/01																					
	4/25/01	8:45	DT	24	2670	2.6	8.3	57	<0.05	1.1	0.459	0.088	<10	<10	4/26/01		2745	8.3	19.5	16.1		
	4/26/01	7:45																				
	5/15/01	10:00	DT	24	2320	3.9	8.6	75	<0.05	2.2	1.71	0.479	<10	<10								
	5/16/01	9:00																				
	5/16/01	10:00	DT	24	2590	3.9	8.6	88	0.65	2.9	1.9	0.549	<10	<10								
	5/17/01	9:00																				
	5/17/01	10:00	DT	24	2520	2.9	8.6	75	<0.05	1.7	1.1	0.34	<10	<10								
	5/18/01	9:00																				
	5/18/01	10:00	DT	24	2380	2.9	8.5	70	<0.05	4.3	1.35	0.337	<10	<10								
	5/19/01	9:00																				
	5/19/01	10:00	DT	24	2450	4.5	8.5	62	<0.05	2	1.19	0.288	<10	<10								
	5/20/01	9:00																				
	5/20/01	10:00	DT	24	2440	3.6	8.6	66	0.068	1.6	0.918	0.265	<10	<10								
	5/21/01	9:00																				
	5/21/01	10:00	DT	24	3120	0.7	8.2	66	<0.05	0.37	0.581		<10	<10								
	5/22/01	9:00																				
	5/22/01	10:00	DT	24	2370	4.9	8.5	57	<0.05	1.5	0.887	0.224	10	<10								
	5/23/01	9:00																				
	5/30/01	9:05	DT	24	2190	3.2	8.4	53	<0.05	1.5	1.35	0.417	<10	<10	5/31/01		2979	8.2	22.9	13.7		
	5/31/01	8:05																				
	6/7/01	8:55	DT		2510	2.5	8.4	53	<0.05	0.66	0.765	0.024	<10	<10								
	6/8/01	7:55																				
	6/14/01	9:03	DT	24	2240	2.8	8.5	44	<0.05	0.74	0.734	0.201	<10	<10								
	6/15/01	8:03																				

RMP WATERSHED SITES
Bonita Canyon Wash

STATION	DATE	TIME	SAMPLES		EC mmhos	Turb NTU	pH	NO ₃ mg/L	NH ₃ mg/L	TKN mg/L	PO ₄ mg/L	o-PO ₄ mg/L	TSS mg/L	VSS mg/L	Field Measurements		EC mmhos	pH	TEMP C	DO mg/L	
			Type	#											Date	Time					
BCF04	7/25/00	13:14	DT	1	2780	75	8.1	1.8	<0.05	0.6	0.285	0.021	300	40			2.84	7.9	21	7.8	
	8/29/00	12:13	DT	24	2470	6.9	8.3	1.5	<0.05	0.34	0.398	0.065	10	<10	8/29/00	12:15	3040	7.8	20.8	8	
	8/30/00	11:13																			
	9/7/00	12:43	DT	24	3360	20	8.3	2.4	<0.05	0.67	0.612	0.026	50	<10	9/8/00		3160	7.8	21.3	9.9	
	9/8/00	11:43																			
	10/3/00	11:42	DT	24	3010	10	7.8	2.3	<0.05	0.42	0.153	0.036	34	<10	10/4/00	11:40	2580	8.2	24	6.7	
	10/4/00	10:42																			
	10/27/00	3:22	ST	2	2160	2.5	7.7	6.1	0.213	2.3	1.59	0.219	<10	<10							
	10/27/00	5:22																			
	11/7/00	10:43	DT	24	2940	5.9	8.3	11	<0.05	0.52	0.337	0.074	<10	<10							
	11/8/00	9:43																			
	12/21/00	14:00	DT	24	3040	1.4	8.3	2.6	<0.05	0.31	0.153	0.02	<10	<10	12/22/00		1290	7.1	15.9	8.1	
	12/22/00	13:00																			
	1/2/01	11:42	DT	24	2960	1.3	8.3	2.5	<0.05	0.52	0.122	0.053	<10	<10	1/2/01	11:00	1130	7.3	15.2	10.2	
	1/3/01	10:42																			
	2/5/01	11:01	DT	24	2740	4.6	8.5	2.1	<0.05	1.8	0.0918	0.047	<10	<10	2/6/01	11:01	2500		14.8	10.5	
	2/6/01	9:01																			
	2/12/01	14:13	ST	10	346	648	7.6	3.2	0.084	1.4	1.35	0.212	540	40							
	2/13/01	10:13	SF																		
	2/13/01	10:13	ST	14	723	300	7.9	4.1	<0.05	1.2	0.979	0.19	230	24							
	2/14/01	12:13	SF																		
	2/14/01	14:13	ST	17	1640	51	8.2	3.7	<0.05	0.43	0.612	0.112	35	<10	2/16/01	13:45	1940	7.6	12.5	10.1	
	2/16/01	1:00	SF																		
	2/20/01	12:20	ST	10	1540	9.7	8.2	1.1	<0.05	0.33	0.214		<10	<10	2/22/01	9:15	2212	8.2	12.1	8.8	
	2/21/01	7:22	SF																		
	2/25/01	15:45	ST	5	472	273	7.8	2.5	<0.05	1.2	1.01		270	26							
	2/25/01	16:33	SF																		
	2/25/01	18:14	ST	14	418	462	7.6	2	<0.05	1.3	1.13		430	42	2/26/01	9:25	524	8.5	12.2	5.7	
	2/26/01	20:14	SF																		
	2/27/01	22:14	ST	29	916	109	8.1	3.4	<0.05	0.71	0.734		72	<10							
	3/1/01	7:17	SF																		
	3/6/01	3:40	ST	5	1330	120	7.5	2.7	<0.05	0.94	0.643	0.071	170	20							
	3/6/01	4:40	SF																		
	3/6/01	6:40	ST	7	676	140	7.7	1.7	<0.05	0.91	0.612	0.081	120	<10							
	3/6/01	18:40	SF																		
	3/6/01	20:40	ST	14	1700	13	8.2	0.73	<0.05	0.61	0.214	0.067	21	<10							
	3/7/01	22:40	SF																		
	3/8/01	0:40	ST	27	2230	14	8.3	1.2	<0.05	0.56	0.153	0.046	18	<10							
	3/10/01	4:40	SF																		
	4/12/01		DT	24	1720	21	8.1	1.5	<0.05	0.62	0.398	0.067	30	<10							
	4/13/01																				
	6/28/01		DT	1	2900	69	7.9	2.6	<0.05	0.67	0.826	0.143	160	18							

RMP WATERSHED SITES
Central Irvine Channel - NPDES Station

STATION	DATE	TIME	SAMPLES		Turb NTU	pH	NO ₃ mg/L	NH ₃ mg/L	TKN mg/L	PO ₄ mg/L	o-PO ₄ mg/L	TSS mg/L	VSS mg/L	Field Measurements		EC mmhos	pH	TEMP C	DO mg/L	
			Type	#										Date	Time					
CICF25	7/7/00	10:35	DT	1	1520	30	9.1	32	0.234	3.3	1.96	0.383	32	12						
	7/7/00	10:35	DF																	
	7/20/00	10:45	DT	1	1940	23	8.7	88	0.094	2.6	3.18	0.916	24	9						
	8/9/00	8:15	DT	24	1970	58	8	170	10.5	9	7.65	2.61	160	30						
	8/10/00	7:15																		
	8/24/00	10:00	DT	24	1960	17	8.3	84	0.238	2.9	7.96	1.92	<10	<10	8/24/00	10:00	1530	7.4	24.5	13.6
	8/25/00	9:00																		
	9/5/00	14:02	DT	24	1930	20	8.1	57	0.148	5.6	4.28	0.732	220	22	9/6/00	14:04	1070	9.1	31.1	13.3
	9/6/00	13:02																		
	9/19/00	8:04	DT	24	2040	78	8.4	35	<0.05	3.49	3.98	0.749	140	28	9/20/00	7:50	2090	7.9	21.1	8.1
	9/20/00	7:04																		
	10/3/00	9:14	DT	24	1460	35	8.4	57	0.179	1.8	2.88	0.892	120	11						
	10/4/00	8:14																		
	10/17/00	11:22	DT	24	1830	132	8.2	66	0.282	3.9	3.06	0.57	170	26						
	10/18/00	10:22																		
	11/2/00	10:30	DT	24	1940	24	8.2	150	3.35	4.5	6.12	0.934	<10	<10						
	11/3/00	9:30																		
	11/30/00	9:48	DT	24	1930	26	8.1	120	1.73	2.3	5.81	1.82	12	<10	12/1/00	7:30	1094	7.8	13.9	7
	12/1/00	8:48																		
	12/14/00	8:16	DT	24	1860	13	8.6	150	0.825	2.1	5.2	1.04	17	<10	12/15/00	7:45	1390	7	15.1	7.8
	12/15/00	7:16																		
	12/21/00	10:22	DT	24	1960	167	8	180	8.34	10	1.25	3.21	210	34	12/22/00		1100	7.9	14.1	10.1
	12/22/00	9:22																		
	1/2/01	8:15	DT	24	1880	24	8.1	120	<0.05	1.7	4.59	1.49	25	<10	1/2/01	9:00	962	6.3	11.3	10
	1/3/01	7:15																		
	2/1/01	9:45	DT	24	2210	2	8.1	100	<0.05	0.24	0.918	0.256	<10	<10	2/1/01		1483	15.1	10.9	
	2/2/01	8:45																		
	2/14/01		ST	24	1140	126	7.8	88	0.685	3.9	7.34	1.86	93	14	2/15/01		1917	7.6	18.6	10.1
	2/15/01																			
	3/13/01	8:45	DT	24	1810	19	8	150	3.21	4.7	2.72	0.74	15	<10	3/13/01	9:00	1965	7.9	16.1	15
	3/14/01	7:45																		
	3/27/01	8:24	DT	24	1860	12	7.9	220	0.425	2.8	8.26	2.37	21	<10	3/27/01	9:00	330	8.5	16.3	16.5
	3/28/01	7:24																		
	4/12/01	9:15	DT	24	1810	12	7.9	190	6.26	8.6	6.12	2.04	13	<10	4/12/01	9:00	1941	8.4	15.1	12.7
	4/13/01	8:15																		
	4/18/01	8:35	DT	24	1900	3.4	9.2	190	<0.05	3.2	2.05	0.562	<10	<10	4/19/01		1798	8.4	16.2	14.9
	4/19/01	7:35																		
	4/25/01	7:45	DT	24	2070	55	8.3	290	17.2	23	10.7	5.59	61	12	4/26/01		2104	8.1	16.9	11.2
	4/26/01	6:45																		
	5/1/01	15:25	DT	1	2100	13	7.4	220	21.2	30	10.1		10	<10						
	5/15/01	10:00	DT	6	1540	94	8.6	180	1.63	6.9	7.04		86	13						
	5/15/01	15:00																		
	5/15/01	16:00	DT	6	1600	151	8.7	180	<0.05	3.6	5.81		1.76	134	15					
	5/15/01	21:00																		
	5/16/01	22:00	DT	6	1630	67	8.1	160	0.924	3.9	7.96		44	<10						
	5/16/01	3:00																		
	5/16/01	4:00	DT	6	1870	121	7.9	240	16.3	21	14.4		3.57	150	21					
	5/16/01	9:00																		
	5/16/01	10:00	DT	6	1660	54	8.6	230	9.29	17	7.04	1.85	51	11						
	5/16/01	15:00																		
	5/16/01	22:00	DT	6	1900	23	7.9	300	10.5	20	11.6	3.05	18	<10						
	5/17/01	3:00																		
	5/16/01	16:00	DT	6	1890	49	8.6	250	7.28	14	6.12	1.34	45	12						

RMP WATERSHED SITES
Central Irvine Channel - NPDES Station

STATION	DATE	TIME	SAMPLES Type	#	EC mmhos	Turb NTU	pH	NO ₃ mg/L	NH ₃ mg/L	TKN mg/L	PO ₄ mg/L	o-PO ₄ mg/L	TSS mg/L	VSS mg/L	Field Measurements Date	Time	EC mmhos	pH	TEMP C	DO mg/L
CICF25	5/16/01	21:00																		
	5/17/01	4:00	DT	6	1980	23	7.9	260	14.6	24	13.2	3.89	21	<10						
	5/17/01	9:00																		
	5/17/01	10:00	DT	6	1660	105	9.1	140	1.06	5.4	4.9	0.799	140	32						
	5/17/01	15:00																		
	5/17/01	16:00	DT	6	1470	21	9.3	160	0.243	4.2	2.66	0.575	37	<10						
	5/17/01	21:00																		
	5/17/01	22:00	DT	2				200	2.49	4.6	6.43	1.6								
	5/17/01	23:00																		
	5/18/01	0:00	DT	8	1880	16	8.2	180	3.21	6.1	7.65	2.2	25	<10						
	5/18/01	7:00																		
	5/18/01	8:00	DT	2				250	8.14	20	15.9	3.67								
	5/18/01	9:00																		
	5/18/01	10:00	DT	24	1690	15	8.4	160	0.435	5.3	5.81	1.38	22	<10						
	5/19/01	9:00																		
	5/19/01	10:00	DT	6	1800	92	8.9	110	0.059	3.5	5.81	0.686	150	29						
	5/19/01	15:00																		
	5/19/01	16:00	DT	6	1860	103	8.2	220	0.149	5.8	7.96	0.921	150	31						
	5/19/01	21:00																		
	5/19/01	22:00	DT	6	1690	23	7.7	180	<0.05	2.8	9.18	2.06	27	<10						
	5/20/01	3:00																		
	5/20/01	4:00	DT	6	1870	18	8	160	<0.05	2.5	8.57	2.37	25	<10						
	5/20/01	9:00																		
	5/20/01	10:00	DT	6	1670	15	8.5	180	<0.05	4	4.28	0.913	20	<10						
	5/20/01	15:00																		
	5/20/01	16:00	DT	6	1820	14	8.7	220	0.054	3.4	2.08	0.375	21	<10						
	5/20/01	21:00																		
	5/20/01	22:00	DT	6	1810	6.3	9	170	<0.05	3	6.43	1.96	11	<10						
	5/21/01	3:00																		
	5/21/01	4:00	DT	6	1790	7.3	8.2	130	<0.05	3.3	7.65	2.43	14	<10						
	5/21/01	9:00																		
	5/21/01	10:00	DT	6	1700	14	8.9	110	<0.05	2.4	3.37	0.796	24	<10						
	5/21/01	15:00																		
	5/21/01	16:00	DT	6	1710	8.4	9.2	140	<0.05	<0.2	1.62	0.305	12	<10						
	5/21/01	21:00																		
	5/21/01	22:00	DT	6	1610	8.5	8.2	110	<0.05	0.48	5.51	1.53	11	<10						
	5/22/01	3:00																		
	5/22/01	4:00	DT	6	1540	12	8.1	70	<0.05	<0.2	6.12	0.03	18	<10						
	5/22/01	9:00																		
	5/22/01	10:00	DT	6	1560	73	8.9	70	0.12	<0.2	3.98	0.59	110	26						
	5/22/01	15:00																		
	5/22/01	10:00	DUP	6	1520	61	8.9	66	0.105	<0.2	3.67	0.594	110	26						
	5/22/01	15:00																		
	5/22/01	16:00	DT	6	1690	21	8.8	180	0.982	4	2.63	0.582	33	10						
	5/22/01	21:00																		
	5/22/01	22:00	DT	6	1610	10	7.8	150	1.3	<0.2	6.12	1.68	14	<10						
	5/23/01	3:00																		
	5/23/01	4:00	DT	6	1630	12	7.9	140	0.671	3	7.04	2.32	13	<10						
	5/23/01	9:00																		
	5/30/01	8:35	DT	24	1650	110	7.7	120	5.55	12	13.5	1.81	600	130	5/31/01		1811	8.5	19.7	12
	5/31/01	7:35																		
	6/20/01	9:55	DT	24	2070	23	8.3	280	0.095	3.2	10.4	3.37	26	<10						
	6/21/01	8:55																		
	6/28/01		DT	1	1780	31	8.8	110	0.168	3.4	4.9	1.6	30	<10						

RMP WATERSHED SITES
Costa Mesa Channel

STATION	DATE	TIME	SAMPLES Type	#	EC mmhos	Turb NTU	pH	NO ₃ mg/L	NH ₃ mg/L	TKN mg/L	PO ₄ mg/L	o-PO ₄ mg/L	TSS mg/L	VSS mg/L	Field Measurements Date	Field Measurements Time	EC mmhos	pH	TEMP C	DO mg/L
CMCG02	7/7/00	11:30	DT	1	830	27	9.5	<0.44	0.133	2.8	1.44	0.293	22	16						
	7/7/00	11:30	DF																	
	7/13/00	9:00	DT	1	845	7.2	8.7	<0.44	0.086	1.6	7.04	0.426	13	10						
	7/13/00	9:00	DF																	
	7/19/00	12:30	DT	1	765	7.6	9.4	0.58	<0.05	1.6	1.78	0.688	<10	<1						
	7/19/00	12:30	DF																	
	7/26/00	12:45	DT	1	1120	4	8.4	1.1	0.356	14	309	0.691	<10	<1						
	7/26/00	12:45	DF																	
	8/4/00	13:30	DT	1	770	4.9	9.6	0.44	0.103	2.1	1.29	0.295	22	18	8/4/00	13:30	843	9.4	31.9	7.8
	8/4/00	13:30	DF	1																
	8/9/00	11:43	DT	24	845	4.7	8.4	66	<0.05	1.5	0.581	0.93	10	8	8/10/00	14:30	718	9.2	33.1	8.8
	8/10/00	10:43	DF																	
	8/17/00	8:31	DT	1	1060	11	7.7	1.2	0.137	1.4	1.25	0.277	20	12						
	8/17/00	8:31	DF																	
	8/24/00	12:32	DT	24	1040	4.4	7.6	1.2	0.134	1.1	1.9	0.6	<10	<10	8/24/00	12:05	455	9.4	26.2	11.3
	8/25/00	11:32	DF																	
	8/29/00	10:20	DT	24	870	14	8.2	0.51	0.263	4.3	2.26	0.521	31	18	8/29/00	11:10	395	8.2	236	11.2
	8/30/00	9:20	DF																	
	9/5/00	13:37	DT	24	1100	21	8.2	0.75	0.094	1.6	3.67	0.874	72	19	9/6/00	13:30	850	8.9	26.2	10
	9/6/00	12:37	DF																	
	9/12/00	8:57	DT	24	990	4.4	7.8	0.58	0.301	2.3	2.6	0.59	<10	<10	9/13/00	7:45	872	8.3	20.2	6.7
	9/13/00	7:57	DF																	
	9/19/00	9:53	DT	24	940	6.4	8.3	1.5	0.134	4.07	2.97	0.536	18	10	9/20/00	9:10	780	8.1	21.1	7.6
	9/20/00	8:53	DF																	
	9/26/00	10:57	DT	24	810	3	9.4	<0.44	<0.05	1.4	1.29	0.269	<10	<10						
	9/27/00	9:57	DF																	
	10/5/00	9:30	DT	24	790	4	8.8	3.7	0.112	1.5	1.59	0.261	12	<10	10/6/00		656	8.2	20.4	9.7
	10/6/00	8:30	DF																	
	10/11/00	6:07	ST	5	845	15	6.9	16	2.45	64	5.51	0.709	170	115						
	10/11/00	7:07	SF																	
	10/11/00	9:07	ST	12	490	10	6.9	15	0.461	6.6	4.59	0.993	42	30						
	10/11/00	21:07	SF																	
	10/11/00	23:07	ST	44	825	6	7.8	0.65	<0.05	1.6	0.581	0.405	<10	<10						
	10/15/00	7:07	SF																	
	10/17/00	8:40	DT	24	815	5.9	8.6	0.68	<0.05	1.6	1.16	0.169	<10	<10						
	10/18/00	7:40	DF																	
	10/26/00	3:25	ST	4	380	85	7.1	9.3	0.568	5	2.23	0.128	280	140						
	10/26/00	4:10	DF																	
	10/27/00	6:10	ST	11	210	24	7	5.9	0.205	2.2	1.62	0.361	43	20						
	10/28/00	10:10	SF																	
	10/28/00	12:10	ST	2																
	10/28/00	12:10	SF																	
	10/29/00	10:10	ST	5	655	5.1	8.5	1.1	<0.05	0.97	1.38	0.212	<10	<10						
	10/29/00	18:10	SF																	
	10/29/00	20:10	ST	4	255	17	7.4	2.8	0.057	0.87	1.38	0.349	16	10						
	10/30/00	4:10	SF																	
	11/8/00	11:00	DT	1	785	78	8.2	<0.44	<0.05	3.3	3.37	0.288	270	78						
	11/8/00	11:00	DF																	
	11/16/00	11:00	DT	1	865	20	8.4	4.1	0.088	2.1	2.48	0.452	58	23						
	11/16/00	11:00	DF																	

RMP WATERSHED SITES
Costa Mesa Channel

STATION	DATE	TIME	SAMPLES Type	#	EC mmhos	Turb NTU	pH	NO ₃ mg/L	NH ₃ mg/L	TKN mg/L	PO ₄ mg/L	o-PO ₄ mg/L	TSS mg/L	VSS mg/L	Field Measurements Date	Field Measurements Time	EC mmhos	pH	TEMP C	DO mg/L	
CMCG02	11/30/00	9:11	DT	24	865	4.1	8.7	2.2	0.171	1	0.857	0.16	<10	<10	12/1/00	9:45	590	8.1	15.1	9.9	
	12/1/00	8:11	DF																		
	12/8/00	12:00	DT	1	705	14	8.8	53	0.225	1	1.56	0.128	15	13	12/8/00	12:00	610	8	16.2	11.2	
	12/8/00	12:00	DF																		
	12/14/00	10:00	DT	24	825	4.5	8.6	4.6	0.167	1.4	1.41	0.368	<10	<10			670	8	14.3	8.7	
	12/15/00	9:00	DF																		
	12/22/00	12:20	DT	1	815	7.6	8.8	4.4	0.12	3.8	1.96	0.257	14	<10							
	12/22/00	12:20	DF																		
	12/26/00	10:30	DT	24	610	8.1	8.1	2.2	<0.05	0.84	0.643	0.093	16	<10							
	12/27/00	9:30	DF																		
	1/2/01	9:15	DT	24	925	3.3	7.6	2.2	0.244	2.1	0.949	0.23	<10	<10	1/2/01	10:30	900	7.2	13.1	9	
	1/3/01	8:15	DF																		
	1/8/01	11:10	ST	4	690	230	6.7	26	4.24	21	9.18	0.906	500	230							
	1/8/01	11:55																			
	1/9/01	7:54	ST	17	690	50	7.7	7.7	0.133	3	1.04	0.41	29	<10							
	1/10/01	15:54	SF																		
	1/10/01	17:54	ST	22	160	32	7	3.3	0.289	1.3	1.96	0.4	33	14							
	1/12/01	11:54	SF																		
	1/17/01	9:09	DT	24	3120	17	8.2	53	<0.05	1.2	0.704	0.16	25	<10							
	1/18/01	8:09	DF																		
	1/24/01	7:32	ST	5	175	72	6.9	7	1.12	3.4	1.84	0.361	150	58							
	1/24/01	10:32	ST	1				280	0.546	3.2	1.5										
	1/25/01	9:12	ST	11	865	7	7.4	5.3	2.08	3.1	3.67	0.881	<10	<10							
	1/26/01	5:12	SF																		
	1/26/01	7:12	ST	9	185	27	7.5	4.2	0.34	1.3	1.32	0.324	25	<10							
	1/26/01	23:12	SF																		
	1/27/01	1:12	ST	16	810	7.8	8.4	6.6	0.135	1.1	1.1	0.304	<10	<10							
	1/28/01	7:12	SF																		
	2/1/01	10:20	DT	24	1060	4.7	8.6	14	2.11	3.2	1.59	0.427	<10	<10	2/1/01		640		13	8.1	
	2/2/01	9:20	DF																		
	2/5/01	9:09	DT	24	976	2.2	8.9	2.2	0.054	6	0.826	0.174	<10	<10	2/6/01	9:09	915		16.3	14.3	
	2/6/01	7:09																			
	2/5/01	9:09	DF	24																	
	2/6/01	7:09																			
	2/14/01		ST	24	1260	16	8.4	7.6	<0.05	2.6	0.796	0.161	<10	<10							
	2/15/01		SF																		
	2/22/01	10:35	DT	24	1350	9.4	8.3	2.4	<0.05	1	0.857	0.141	<10	<10							
	2/23/01	9:35	DF													2/22/01	10:35	1200	9.4	16	19.7
	3/7/01		ST	5	93	30	5.6	2.1	0.19	1.2	1.07	0.181	58	21							
	3/7/01		SF																		
	3/9/01		ST		1580	2.4	8.1	6.6	<0.05	2.1	0.275	0.055	<10	<10							
	3/9/01		SF																		
	3/13/01		DT	24	1360	2.4	9.1	1.9	<0.05	1	0.184	0.011	15	<10							
	3/14/01		DF																		
	3/20/01	9:55	DT	24	1060	15	8.9	1.5	0.069	3.3	0.643	0.062	45	14	3/20/01	10:30	1208	8.96	20.7	19	
	3/21/01	8:55	DF																		
	3/27/01	10:25	DT	24	1270	2.5	8.5	1.5	<0.05	1.1	0.306	0.069	<10	<10	3/27/01	9:00	604	9.4	21.2	19.3	
	3/28/01	9:25	DF																		

RMP WATERSHED SITES
Costa Mesa Channel

STATION	DATE	TIME	SAMPLES Type	#	EC mmhos	Turb NTU	pH	NO ₃ mg/L	NH ₃ mg/L	TKN mg/L	PO ₄ mg/L	o-PO ₄ mg/L	TSS mg/L	VSS mg/L	Field Measurements Date	Field Measurements Time	EC mmhos	pH	TEMP C	DO mg/L
CMCG02	4/3/01		DT	24	1370	5.1	8.4	1.3	0.095	1.5	0.367	0.051	15	<10						
	4/4/01		DF																	
	4/12/01	11:00	DT	24	2730	1.9	8.3	12	<0.05	13	0.275	0.035	<10	<10	4/12/01	9:00	1241	9.6	21.2	24.7
	4/13/01	10:00	DF																	
	4/18/01	10:05	DT	24	1240	6.3	8.9	<0.44	0.083	1.4	0.398	0.06	23	11	4/19/01		1100	9	18.3	17.8
	4/19/01	9:05	DF																	
	4/25/01	9:45	DT	24	1420	3.3	8.6	2.8	<0.05	4.7	0.765	0.142	<10	<10	4/26/01		2104	8.5		
	4/26/01	8:45	DF																	
	5/3/01	9:45	DF																	
	5/2/01	10:45	DT	24	1400	3.1	8.7	0.66	<0.05	1.4	0.796	0.258	<10	<10	5/3/01		1055	8.8	18.7	12.5
	5/3/01	9:45	DF																	
	5/24/01	9:06	DT	24	2080	3	8.1	13	0.137	3	1.07	0.273	<10	<10						
	5/25/01	8:06	DF																	
	5/30/01	10:35	DT	24	1330	11	8.5	2.3	0.167	22	0.826	0.097	39	17	5/31/01		1192	9.2	24.3	17.6
	5/31/01	9:35	DF																	
	6/7/01		DT	24	1170	4.2	8.8	<0.44	<0.05	1.6	0.49	0.088	<10	<10						
	6/8/01		DF																	
	6/14/01	10:13	DT	24	1160	6.1	8.5	0.94	<0.05	1.5	1.41	0.262	12	<10						
	6/15/01	9:13	DF																	
	6/20/01	10:35	DT	24	1080	4.3	8.4	<0.44	<0.05	1.9	1.32	0.368	<10	<10						
	6/21/01	9:35	DF																	
	6/28/01		DT	1	914	37	8.7	<0.44	0.066	3	2.54	0.435	110	58						
	6/28/01		DF																	

RMP WATERSHED SITES
Lane Channel

STATION	DATE	TIME	SAMPLES		EC mmhos	Turb NTU	pH	NO ₃ mg/L	NH ₃ mg/L	TKN mg/L	PO ₄ mg/L	o-PO ₄ mg/L	TSS mg/L	VSS mg/L	Field Measurements		EC mmhos	pH	TEMP C	DO mg/L
			Type	#											Date	Time				
LANF08	7/25/00	13:20	DT	1	4770	6.5	8.5	21	<0.05	1.3	0.734	0.136	<10	<1	7/25/00	13:20	5680	7.3	22.9	10.8
	8/29/00	13:29	DT	24	7560	15	8.1	24	0.181	1.2	1.16	0.227	20	<10	8/29/00	12:45	10680	7.2	23.3	10.5
	8/30/00	12:29																		
	9/7/00	10:19	DT	24	5880	10	8	21	0.241	1.1	1.22	0.174	17	<10	9/8/00	13:00	5300	7.4	24.6	8
	9/8/00	9:19																		
	10/5/00	10:43	DT	24	5360	18	8.4	27	0.187	1.2	1.53	0.276	60	11	10/6/00	10:15	3900	7.4	20.6	3.3
	10/6/00	9:43																		
	10/27/00	2:55	ST	5	3180	65	8	35	0.386	3.6	1.5	0.211	100	22						
	10/27/00	3:55																		
	10/27/00	5:55	ST	8	935	120	7.5	7.4	0.218	2.2	1.65	0.157	190	34						
	10/27/00	19:55	SF																	
	10/27/00	21:55	ST	19	4730	18	7.9	23	0.226	1.7	0.887	0.157	25	<10	10/29/00	9:25	5400	7.81	19.18	7.64
	10/29/00	8:55	SF																	
	10/29/00	11:55	ST	5	8120	22	8.3	33	0.184	2.6	0.765	0.157	25	<10						
	10/29/00	19:55	SF																	
	10/29/00	21:55	ST	10	2910	39	7.8	7.9	0.189	0.99	0.887	0.146	61	11						
	10/30/00	15:55	SF																	
	10/30/00	17:55	ST	6	5460	20	8.1	15	0.218	1.5	0.734	0.111	26	<10						
	10/31/00	3:55	SF																	
	11/7/00	11:03	DT	24	6120	11	8.3	30	<0.05	0.84	0.643	0.103	11	<10						
	11/8/00	10:03																		
	12/21/00	13:42	DT	24	6320	28	8.3	39	0.151	1.1	1.35	0.262	44	11	12/22/00		4890	8	14.9	9
	12/22/00	12:42																		
	1/2/01	10:59	DT	24	5720	0.5	8	31	0.109	1.1	1.19	0.23	22	<10	1/2/01	9:30	3112	6.9	13.1	6.7
	1/3/01	9:59																		
	1/8/01	12:57	ST	5	1790	340	7.1	26	2	9.1	4.9	0.159	700	120						
	1/8/01	13:57	SF																	
	1/8/01	15:57	ST	5	745	120	7	8.4	1.43	3	1.5	0.132	210	48						
	1/8/01	23:57	SF																	
	1/9/01	3:57	ST	19	4710	15	8	29	0.566	2.4	0.887	0.27	18	<10						
	1/10/01	15:57	SF																	
	1/10/01	17:57	ST	23	425	19	7.7	4.7	0.265	1.2	1.13	0.19	140	23						
	1/12/01	13:57	SF																	
	1/17/01	7:30	DT	24	6890	5.7	8.1	44	0.106	0.95	0.398	0.117	12	<10	1/18/01	8:20	2690	7.5	9.3	13.9
	1/18/01	8:30																		
	1/24/01	8:06	ST	5	2160	137	7.6	21	0.778	5.4	1.93	0.128	290	52						
	1/24/01	9:06	SF																	
	1/24/01	11:06	ST	9	2200	26	7.7	8.3	0.583	1.7	0.765	0.147	24	<10						
	1/25/01	3:06	SF																	
	1/25/01	5:06	ST	14	5020	8	8.1	33	0.216	4.6	1.04	0.26	<10	<10						
	1/26/01	7:06	SF																	
	1/26/01	9:06	ST	9	590	66	7.8	5.6	0.425	1.4	0.765	0.1	82	16						
	1/27/01	1:06	SF																	
	2/5/01		DT	24	6120	2.8	9.2	42	0.114	1.2	1.07	0.235	<10	<10	2/6/01	10:16	5720		18.8	26.5
	2/6/01																			
	3/13/01	9:25	DT	24	6170	4.7	8.3	44	<0.05	0.69	0.214	0.068	11	<10	3/13/01		6030	8.2	18.1	215
	3/14/01	8:25																		
	4/18/01	9:36	DT	24	5930	4.6	8.8	35	<0.05	0.79	0.536	0.114	20	<10	4/19/01		5783	9	18.5	16.8
	4/19/01	8:36																		
	5/2/01	9:00	DT	24	5400	4.9	8.3	41	<0.05	0.9	1.07	0.226	<10	<10	5/3/01		5517	8	18.5	3.6
	5/3/01	8:00																		

RMP WATERSHED SITES
Lane Channel

STATION	DATE	TIME	SAMPLES		EC mmhos	Turb NTU	pH	NO ₃ mg/L	NH ₃ mg/L	TKN mg/L	PO ₄ mg/L	o-PO ₄ mg/L	TSS mg/L	VSS mg/L	Field Measurements		EC mmhos	pH	TEMP C	DO mg/L
			Type	#											Date	Time				
LANF08	5/15/01	10:00	DT	24	4140	7.4	8.4	32	<0.05	1.2	3.98			<10	<10					
	5/16/01	9:00																		
	5/15/01	16:00	SUB	18	3780	8.3	8.4	29	<0.05	1.3	5.2			<10	<10					
	5/16/01	9:00																		
	5/16/01	10:00	DT	24	5190	5.1	8.5	37	<0.05	1	1.74			<10	<10					
	5/17/01	9:00																		
	5/17/01	10:00	DT	24	5370	5.2	8.6	35	0.07	0.92	1.35	0.294		<10	<10					
	5/18/01	9:00																		
	5/18/01	10:00	DT	24	5430	5	8.4	37	<0.05	1.5	1.35			10	<10					
	5/19/01	9:00																		
	5/19/01	10:00	DT	24	5610	6.3	8.4	35	<0.05	1.3	1.32			11	<10					
	5/20/01	9:00																		
	5/20/01	10:00	DT	24	5240	6.4	7.9	34	<0.05	1.1	1.07			15	<10					
	5/21/01	9:00																		
	5/21/01	10:00	DT	24	1740	3.4	7.9	70	0.907	3.3	2.69			<10	<10					
	5/22/01	9:00																		
	5/22/01	10:00	DT	24	5070	3.7	8.4	38	<0.05	0.86	1.16			<10	<10					
	5/23/01	9:00																		
	6/14/01	9:27	DT	24	4650	12	8.4	32	<0.05	0.91	2.42	0.544		17	<10					
	6/15/01	8:27																		

RMP WATERSHED SITES
El Modena Irvine Channel

STATION	DATE	TIME	SAMPLES Type	#	EC mmhos	Turb NTU	pH	NO ₃ mg/L	NH ₃ mg/L	TKN mg/L	PO ₄ mg/L	o-PO ₄ mg/L	TSS mg/L	VSS mg/L	Field Measurements Date	Field Measurements Time	EC mmhos	pH	TEMP C	DO mg/L
MIRF07	7/25/00	12:50	DT	1	1120	9.1	9.6	5.3	0.32	5.6	2.14	0.277	<10	<1			1120	8.8	27.9	22
	8/29/00	15:23	DT	24	1160	16	8.6	11	0.343	2.3	1.38	0.293	19	<10	8/29/00	14:15	1075	8.9	28.4	21.6
	8/30/00	14:23																		
	9/7/00	11:00	DT	24	1360	6.3	8.3	7.9	0.2	1.9	1.16	0.118	24	11	9/8/00	13:00	960	8	28.4	22
	9/8/00	10:00																		
	10/17/00	10:52	DT	24	1290	12	8.4	9.6	<0.05	1.2	1.38	0.262	19	10						
	10/18/00	9:52																		
	11/7/00	11:48	DT	24	1330	4.1	8.3	17	<0.05	2.3	0.643	0.096	<10	<10						
	11/8/00	10:48																		
	12/21/00	11:49	DT	24	1250	6	8.6	15	0.102	1.4	1.16	0.217	20	<10						
	12/22/00	10:49																		
	1/2/01	8:40	DT	24	1190	1.7	8.6	8	<0.05	1.5	0.367	0.077	<10	<10	1/2/01	8:00	646	6.6	9.3	8.2
	1/3/01	7:40																		
	2/5/01		DT	24	1070	4.1	8.6	23	<0.05	0.68	0.49	0.12	<10	<10						
	2/6/01																			
	2/13/01	7:31	ST	16	751	25	8	11	0.064	2.3	1.22	0.286	21	<10						
	2/14/01	13:31	SF																	
	2/14/01	15:31	ST	12	1590	20	8.4	18	<0.05	3.4	0.643	0.143	17	<10	2/13/01		1770	8.5	21	9.7
	2/15/01	17:31	SF																	
	2/20/01	13:47	ST	23	1400	3.1	8.6	9.1	<0.05	1.7	0.612	0.152	<10	<10						
	2/22/01	7:47	SF																	
	2/23/01	7:47	ST	5	292	78	7.2	4.5	0.626	2.9	1.19	0.121	140	41						
	2/23/01	8:47	SF																	
	2/23/01	10:47	ST	3	164	44	7.3	3.1	0.15	1.1	0.918	0.128	56	15						
	2/23/01	14:47	SF																	
	2/24/01	12:47	ST	12	316	15	7.4	5.6	0.11	0.78	0.673		14	<10	2/26/01	13:05	352	8.6	16.3	4.7
	2/25/01	10:47	SF																	
	2/25/01	12:47	ST	9	157	44	7.3	2.4	0.082	0.81	1.13		60	<10						
	2/26/01	4:47	SF																	
	2/26/01	6:47	ST	7	598	24	7.9	9.3	0.054	1.1	1.25		15	<10						
	2/26/01	21:47	SF																	
	3/27/01	8:50	DT	24	1490	3.2	8.9	11	<0.05	3	0.428	0.095	14	<10	3/27/01	9:00	1373	9	18.3	24.5
	3/28/01	7:50																		
	4/18/01	9:10	DT	24	1480	2.2	9.1	7.6	<0.05	2.4	0.465	0.09	<10	<10	4/19/01		1741	8.8	16.8	19.2
	4/19/01	8:10																		
	5/15/01	10:00	DT	24	1320	3.1	9.3	9.3	0.358	3.7	1.01		<10	<10						
	5/16/01	9:00																		
	5/16/01	10:00	DT	24	1250	4.1	9	12	<0.05	5.4	1.19		12	<10						
	5/17/01	9:00																		
	5/17/01	10:00	DT	24	1170	2.5	9	13	<0.05	3	0.673		10	<10						
	5/18/01	9:00																		
	5/18/01	10:00	DT	24	1120	3.9	8.8	8.1	<0.05	5.2	0.826		<10	<10						
	5/19/01	9:00																		
	5/19/01	10:00	DT	24	1300	3	8.9	4.7	<0.05	2.8	0.796		10	<10						
	5/20/01	9:00																		
	5/20/01	10:00	DT	24	1220	3.6	9	2.5	<0.05	2.3	0.704		10	<10						
	5/21/01	9:00																		
	5/21/01	10:00	DT	24	1220	2.8	9	3.4	<0.05	1.9	0.826		<10	<10						
	5/22/01	9:00																		
	6/14/01	8:47	DT	24	1430	26	8.7	5.1	0.213	3.4	1.13	0.111	40	14						
	6/15/01	7:47																		

RMP WATERSHED SITES
Santa Ana Delhi Channel

STATION	DATE	TIME	SAMPLES		EC mmhos	Turb NTU	pH	NO ₃ mg/L	NH ₃ mg/L	TKN mg/L	PO ₄ mg/L	o-PO ₄ mg/L	TSS mg/L	VSS mg/L	Field Measurements		EC mmhos	pH C	TEMP C	DO mg/L
			Type	#											Date	Time				
SADF01	7/19/00	12:00	DT	1	785	9.9	8.8	2.3	<0.05	0.31	0.269	0.044	18	8	7/19/00	12:00	1110	7.9	26.9	12.4
	8/4/00	13:05	DT	1	1830	8.4	8.8	8.7	<0.05	0.77	0.459	0.015	19	8	8/4/00	13:05	1170	8.6	30.1	
	8/16/00	15:14	DT	24	2150	10	8	8.8	0.182	1.1	0.459	0.019	27	<10	8/17/00	14:20	1210	8.6	32	
	8/17/00	14:14																		
	8/29/00	11:09	DT	24	1780	6.5	8.2	10	0.059	0.64	0.428	0.028	<10	<10	8/29/00	11:30	1780	7.8	24.3	19.5
	8/30/00	10:09																		
	9/12/00	9:22	DT	24	2140	18	8.1	10	<0.05	0.98	0.275	<0.01	31	<10	9/13/00	8:07	2000	7.9	21.1	6.1
	9/13/00	8:22																		
	9/26/00	13:57	DT	24	2010	2.9	8.4	8.8	<0.05	1.1	0.49	0.046	<10	<10	9/27/00	11:00	1340	8.1	29.9	
	9/27/00	12:57																		
	10/5/00	10:06	DT	24	2340	6.1	8.3	14	<0.05	0.96	0.337	0.026	23	<10	10/6/00	9:15	1700	8	20.4	5.2
	10/6/00	9:06																		
	10/27/00	2:57	ST	5	575	190	7.4	8.9	0.66	6.4	2.97	0.185	470	110						
	10/27/00	3:57	SF																	
	10/27/00	5:57	ST	20	1050	33	7.9	13	0.161	1.6	1.19	0.181	54	13						
	10/28/00	19:57	SF																	
	10/28/00	21:57	ST	5	2040	2.4	8.1	17	<0.05	1	0.337	0.08	<10	<10	10/29/00	9:00	2180	9	18.7	9.1
	10/29/00	5:57	SF																	
	10/29/00	9:57	ST	5	2250	3.6	8.3	16	<0.05	0.7	0.266		<10	<10						
	10/29/00	17:57	SF																	
	10/29/00	19:57	ST	7	520	60	7.5	6.2	0.15	1.3	1.22	0.12	72	24						
	10/30/00	7:57	SF																	
	10/30/00	9:57	ST	12	1480	5.6	8	14	<0.05	0.54	0.367	0.123	<10	<10						
	10/31/00	7:57	SF																	
	11/30/00	10:13	DT	24	2360	2.7	8.1	18	<0.05	0.5	0.184	0.026	<10	<10	12/1/00	9:30	1446	7.8	15.2	9.4
	12/1/00	9:13																		
	12/14/00	11:00	DT	24	2290	4	8.5	24	<0.05	1	0.367	<0.01	32	10	12/15/00	10:00	1540	7.9	14.7	9
	12/15/00	10:00																		
	12/26/00	9:15	DT	24	1810	8	8.3	21	<0.05	0.85	0.428	0.061	20	<10						
	12/27/00	8:15																		
	1/8/01	13:25	ST	5	940	160	7	25	3.67	8.8	2.11	0.21	210	68						
	1/8/01	14:25	SF																	
	1/8/01	16:25	ST	5	400	170	7	9.7	1.29	4.4	2.82	0.198	280	72						
	1/9/01	0:25																		
	1/9/01	2:25	ST	18	1650	18	7.9	23	0.363	1.3	0.765	0.14	15	<10						
	1/10/01	14:25	SF																	
	1/10/01	16:25	ST	23	325	75	7.5	5.9	0.254	1.6	1.1	0.24	110	25						
	1/12/01	12:25	SF																	
	1/17/01	9:50	DT	24	2820	2.3	8.1	30	0.109	0.92	0.214	0.069	<10	<10	1/18/01	8:45	1000	7.7	9.8	10.2
	1/18/01	8:50																		
	1/24/01	8:42	ST	5					16	1.19	3.8	1.16								
	1/24/01	9:42																		
	1/24/01	11:42	ST	9	580	38	7.5	7.3	0.54	2.4	0.887	0.126	70	16						
	1/25/01	3:42	SF																	
	1/25/01	5:42	ST	14	1830	7.9	8.1	17	0.13	0.61	0.245	0.059	<10	<10						
	1/26/01	7:42	SF																	
	1/26/01	9:42	ST	25	925	61	8.1	13	0.35	1.6	0.673	0.103	81	20						
	1/28/01	9:42	SF																	
	2/1/01	10:10	DT	24	3010	1.6	8.2	25	<0.05	0.85	0.184	0.037	<10	<10	2/1/01		1851		11.7	8.9
	2/2/01	9:10																		

RMP WATERSHED SITES
Santa Ana Delhi Channel

STATION	DATE	TIME	SAMPLES Type	#	EC mmhos	Turb NTU	pH	NO ₃ mg/L	NH ₃ mg/L	TKN mg/L	PO ₄ mg/L	o-PO ₄ mg/L	TSS mg/L	VSS mg/L	Field Measurements Date	Time	EC mmhos	pH	TEMP C	DO mg/L
SADF01	2/14/01		ST	24	2180	24	8.1	23	<0.05	0.98	0.428	0.076	10	<10						
	2/15/01																			
	2/22/01	10:10	DT	24	2530	1.7	8.2	21	<0.05	0.56	<0.061	0.032	<10	<10	2/22/01	10:10	2348	7.7	14.8	11.5
	2/23/01	9:10																		
	3/6/01	1:54	ST	5	999	29	7.4	11	0.263	1.2	0.398		31	10						
	3/6/01	2:54	SF																	
	3/6/01	4:54	ST	8	749	25	7.3	8.1	<0.05	1.3	0.49	0.057	29	<10						
	3/6/01	18:54	SF																	
	3/6/01	20:54	ST	12	1980	4	8.2	17	<0.05	0.94	0.0918	0.025	<10	<10						
	3/7/01	19:54	SF																	
	3/7/01	21:00	ST	28	2540	3.6	8.2	21	<0.05	0.94	0.214	0.019	<10	<10						
	3/10/01	3:00	SF																	
	3/20/01	9:20	DT	24	1880	2.1	8.1	12	<0.05	<0.2	0.0612	0.01	<10	<10	3/20/01		2629	7.9	19.3	14.9
	3/21/01	8:20																		
	4/3/01		DT	24	2740	5.3	8.1	18	<0.05	1.5	0.0704	<0.01	41	11						
	4/4/01																			
	4/12/01	10:45	DT	24	2760	1.6	8.1	18	<0.05	0.83	0.214	0.038	<10	<10	4/12/01	9:00	2566	8.1	17.4	18.5
	4/13/01	9:45																		
	5/2/01	9:45	DT	24	2210	6	8.3	13	<0.05	0.83	0.165	0.017	14	<10	5/3/01		2393	7.9	18	10.4
	5/3/01	8:45																		
	5/30/01	10:12	DT	24	2370	6.4	8.2	11	0.06	1.9	0.367	0.032	17	<10	5/31/01		2970	8.1	22.9	12.2
	5/31/01	9:12																		
	6/7/01	10:00	DT		2460	3.2	8.2	11	<0.05	0.51	0.214	<0.01	<10	<10						
	6/8/01	9:00																		
	6/14/01	9:58	DT	24	2640	2.1	8.2	12	<0.05	0.64	0.245	0.03	<10	<10						
	6/15/01	8:58																		

RMP WATERSHED SITES
San Diego Creek at Campus Drive

STATION	DATE	TIME	SAMPLES Type	#	EC mmhos	Turb NTU	pH	NO ₃ mg/L	NH ₃ mg/L	TKN mg/L	PO ₄ mg/L	o-PO ₄ mg/L	TSS mg/L	VSS mg/L	Field Measurements Date	Time	EC mmhos	pH	TEMP C	DO mg/L
SDMF05	7/7/00	12:00	DT	1	3190	60	8.6	12	0.086	2.7	0.612	<0.01	79	27						
	7/7/00	12:00	DF																	
	7/13/00	9:30	DT	1	2900	55	8.5	15	<0.05	1.7	0.468	0.018	110	48						
	7/13/00	9:30	DF																	
	7/19/00	12:15	DT	1	4250	45	8.6	13	<0.05	1.8	0.389	<0.01	81	30						
	7/19/00	12:15	DF																	
	7/25/00	14:10	DT	1	2490	50	8.7	10	<0.05	2.7	0.487	<0.01	73	26						
	8/4/00	12:50	DT	1	2880	20	8.7	62	<0.05	0.36	0.153	<0.01	42	14			2010	8.4	27.7	
	8/9/00	11:15	DT	24	2500	50	8.4	62	<0.05	1.4	1.1	0.017	120	19	8/10/00	14:00	2800	8.1	29.1	9.2
	8/10/00	10:15																		
	8/17/00	14:00	DT	1	3020	28	8.2	29	0.056	1	6.12	0.086	50	<10	8/17/00	14:00	2100	8.3	28.9	
	8/24/00	12:04	DT	24	2940	140	8.3	19	<0.05	3.1	1.5	0.27	<10	<10	8/24/00	11:30	2870	8.9	28.6	
	8/25/00	11:04																		
	8/29/00	11:37	DT	24	2300	89	8.3	21	0.191	1.5	0.857	0.033	133	17	8/29/00	11:55	2810	7.8	24.3	10.7
	8/30/00	10:37																		
	9/5/00	13:13	DT	24	2860	78	8.4	29	0.095	1.3	0.887	0.091	280	19						
	9/6/00	12:13																		
	9/12/00	10:00	DT	24	3060	120	8.4	27	0.355	0.97	0.887	0.022	210	21	9/13/00	8:20	2920	8	21.7	6.5
	9/13/00	9:00																		
	9/19/00	7:19	DT	24	2840	121	8.4	27	0.086	1.36	1.1	0.024	190	22	9/20/00	8:45	2680	7.9	22.3	5.1
	9/20/00	6:19																		
	9/26/00	10:06	DT	24	3060	34	8.4	23	0.107	1.4	<0.061	0.072	129	19						
	9/27/00	9:06																		
	10/5/00	10:00	DT	24	2680	24	8.7	38	0.628	1.5	0.734	0.096	93	15	10/6/00	10:00	2100	7.9	21.5	3.5
	10/6/00	9:00																		
	10/10/00	13:50	ST	5	2350	26	8.2	44	0.213	2	1.1	0.128	140	18						
	10/10/00	14:50	SF																	
	10/10/00	16:50	ST	22	2270	70	8	36	0.395	3.1	1.68	0.125	140	20						
	10/12/00	12:43	SF																	
	10/12/00	14:43	ST	29	2470	57	8.2	33	0.188	2.1	0.826	0.085	90	13						
	10/14/00	16:43	SF																	
	10/17/00	9:02	DT	24	2970	66	8.3	39	0.195	1.5	0.551	0.06	110	19						
	10/18/00	8:02																		
	10/26/00	18:31	ST	5	2760	32	8.5	40	0.075	1.3	0.459	0.039	37	<10						
	10/26/00	19:31	SF																	
	10/26/00	21:31	ST	21	1250	240	7.9	29	0.236	3	2.69	0.325	370	54	10/29/00	9:30	1490	7.5	17.4	7.6
	10/28/00	13:31	SF																	
	10/29/00	11:31	ST	6	1560	58	7.9	33	0.377	2	1.59	0.384	57	<10						
	10/29/00	21:31	SF																	
	10/29/00	23:31	ST	9	500	604	7.7	11	0.152	2.1	3.06	0.276	650	64						
	10/30/00	15:31	SF																	
	10/30/00	17:31	ST	3	725	169	7.7	18	0.202	1.5	2.02	0.36	120	20						
	10/30/00	21:31	SF																	
	11/7/00	9:52	DT	24	3010	57	8.3	48	<0.05	1.2	0.673	0.061	64	12						
	11/8/00	8:52																		
	11/16/00	10:30	DT	1	2770	28	8.2	53	<0.05	0.74	0.52	0.192	33	<10						
	11/30/00	8:50	DT	24	3040	29	8.4	53	<0.05	1.3	<0.061	0.043	38	10	12/1/00	9:00	1660	7.6	15.5	11.4
	12/1/00	7:50																		
	12/8/00	11:30	DT	1	2810	18	8.2	4.2	<0.05	1.7	0.581	0.334	24	<10	12/8/00	11:30	1500	7.5	16.9	12.9
	12/14/00	10:19	DT	24	2810	21	8.6	53	<0.05	0.9	0.643	0.093	36	12	12/15/00	10:40	1730	7.5	13.9	9.6
	12/15/00	9:19																		

RMP WATERSHED SITES
San Diego Creek at Campus Drive

STATION	DATE	TIME	SAMPLES Type	#	EC mmhos	Turb NTU	pH	NO ₃ mg/L	NH ₃ mg/L	TKN mg/L	PO ₄ mg/L	o-PO ₄ mg/L	TSS mg/L	VSS mg/L	Field Measurements Date	Field Measurements Time	EC mmhos	pH	TEMP C	DO mg/L
SDMF05	12/21/00	11:48	DT	24	3180	25	8.6	48	<0.05	1.2	0.49	0.039	42	13	12/22/00		1510	7.8	15.9	10.9
	12/22/00	10:48																		
	12/26/00	10:01	DT	24	2030	21	8.5	48	<0.05	1.6	0.887	0.304	37	11						
	12/27/00	9:01																		
	1/2/01	9:32	DT	24	2950	33	8.7	44	<0.05	1.7	0.796	0.087	57	16	1/2/01	10:00	1490	7.1	12.1	8.9
	1/3/01	8:32																		
	1/8/01	14:44	ST	5	0	0		39	0.053	1.8	1.07									
	1/8/01	15:44																		
	1/8/01	17:44	ST		790	196	7.4	22	1.12	3.6	3	0.254	250	40						
	1/9/01	5:44																		
	1/10/01	13:44	ST	2	1240	80	7.7	37	0.661	2.7	1.74	0.41	61	12						
	1/10/01	15:44																		
	1/10/01	17:44	ST	22	465	140	7.7	14	0.293	3.2	3.98	0.4	900	88						
	1/12/01	11:44	SF																	
	1/17/01	9:38	DT	24	1250	26	8.4	3.4	0.083	2.4	0.826	0.214	10	<10	1/18/01	9:30	1370	7.7	9.9	10.1
	1/18/01	8:38																		
	1/24/01	9:12	ST	5	2980	21	8.4	53	<0.05	1.4	0.52	0.025	29	<10						
	1/24/01	10:12	SF																	
	1/24/01	12:12	ST	11	700	153	7.7	22	0.57	2.6	1.5	0.282	160	19						
	1/25/01	8:12	SF																	
	1/25/01	10:12	ST	13	1080	58	7.9	25	0.386	1.3	1.32	0.242	36	<10						
	1/26/01	10:12	SF																	
	1/26/01	12:12	ST	14	790	122	7.8	23	0.466	2.7	1.74	0.32	140	19						
	1/28/01	8:30	SF																	
	2/1/01	9:55	DT	24	2880	26	8	48	<0.05	0.27	0.887	0.115	32	<10	2/1/01	9:55	1632	11.1	6.5	
	2/2/01	8:55																		
	2/5/01	9:36	DT	24	2920	22	8.4	48	0.053	0.86	0.184	<0.01	45	13	2/6/01	9:36	2840	15.9	13.2	
	2/6/01	7:36																		
	2/14/01		ST	24	4710	8.4	7.6	210	0.051	0.64	0.337	0.077	11	<10	2/15/01		1787	7.8	12.9	10.6
	2/15/01																			
	2/22/01	9:52	DT	24	1520	24	8.2	31	<0.05	0.71	0.796	0.161	22	<10	2/22/01	9:52	1921	8.4	15.8	13.5
	2/23/01	8:52																		
	3/6/01	4:23	ST	1																
	3/6/01	4:23	SF																	
	3/7/01	0:23	ST	2	827	140	7.7	18	0.129	0.78	1.65	0.064	120	17						
	3/7/01	2:23																		
	3/7/01	9:50	ST	14	1760	25	8.3	33	0.064	1.4	0.918	0.172	36	<10						
	3/8/01	11:50	SF																	
	3/8/01	13:50	ST	20	2290	29	8.4	37	<0.05	1.6	<0.061	0.027	44	<10						
	3/10/01	3:50	SF																	
	3/15/01	9:00	DT	1	2850	23	8.4	44	<0.05	1.1	0.367	0.013	38	<10	3/15/01	9:00	2272	8.2	17.8	12.7
	3/20/01	9:15	DT	24	2560	17	8.4	44	<0.05	1.9	0.337	<0.01	62	13	3/20/01	10:30	160	8.3	20.1	12.8
	3/21/01	8:16																		
	3/27/01	10:03	DT	24	2890	21	8.4	53	<0.05	2.1	0.153	<0.01	65	12	3/27/01	9:00	2941	8.6	19.4	15.7
	3/28/01	9:03																		
	4/3/01		DT	24	2790	38	8.4	38	0.121	2.3	0.398	<0.01	100	19						
	4/4/01																			
	4/12/01	10:00	DT	24	2360	24	8.1	28	<0.05	1.7	0.643	0.012	34	12	4/12/01	9:00	2757	8.2	17.2	10.4
	4/13/01	9:00																		
	4/18/01	10:36	DT	24	2620	34	8.8	28	0.088	2.3	0.361	<0.01	66	19	4/19/01		2546	8.4	20	11.3
	4/19/01	9:36																		

RMP WATERSHED SITES
San Diego Creek at Campus Drive

STATION	DATE	TIME	SAMPLES Type	#	EC mmhos	Turb NTU	pH	NO ₃ mg/L	NH ₃ mg/L	TKN mg/L	PO ₄ mg/L	o-PO ₄ mg/L	TSS mg/L	VSS mg/L	Field Measurements Date	Field Measurements Time	EC mmhos	pH	TEMP C	DO mg/L	
SDMF05	4/25/01	9:20	DT	24	2480	52	8.3	21	<0.05	2.9	0.459	<0.01	110	25	4/26/01		2834	8.4	21.9	13.5	
	4/26/01	8:20																			
	5/2/01	9:20	DT	24	2610	62	8.7	31	<0.05	2.2	0.581	<0.01	94	21		5/3/01		2431	8.3	21.1	10.8
	5/3/01	8:20																			
	5/15/01	10:00	DT	8	2770	63	8.3	37	0.243	2.1	0.796	0.099	75	11							
	5/15/01	17:00																			
	5/16/01	10:00	DT	24	2740	76	8.5	31	<0.05	3.4	0.673	0.016	150	33							
	5/17/01	9:00																			
	5/17/01	10:00	DT	24	2750	78	8.7	30	<0.05	2.8	0.643	0.011	120	26							
	5/18/01	9:00																			
	5/18/01	10:00	DT	24	2780	112	8.5	27	<0.05	3.6	0.673	0.01	150	28							
	5/19/01	9:00																			
	5/19/01	10:00	DT	24	2870	112	8.4	36	<0.05	3.3	0.826	0.012	140	30							
	5/20/01	9:00																			
	5/20/01	10:00	DT	24	2610	95	8.4	37	<0.05	3.3	1.04	0.014	130	28							
	5/21/01	9:00																			
	5/21/01	10:00	DT	24	2740	94	8.2	35	<0.05	2	0.765	0.024	115	19							
	5/22/01	9:00																			
	5/21/01	10:00	DUP	24	2490	88	8.2	34	<0.05	2.6	0.765	0.024	120	22							
	5/22/01	9:00																			
	5/22/01	10:00	DT	24	2740	73	8.3	38	<0.05	1.8	0.704	0.041	92	20							
	5/23/01	9:00																			
	5/30/01	10:00	DT	24	2600	70	8.6	37	<0.05	3.2	1.1	0.098	110	22		5/31/01		3116	8.2	22.7	9.2
	5/31/01	9:00																			
	6/7/01	9:30	DT		2620	66	8.5	33	<0.05	2.6	0.428	0.223	100	17							
	6/8/01	8:30																			
	6/14/01	9:43	DT	24	2520	93	8.5	24	<0.05	2	0.673	<0.01	120	25							
	6/15/01	8:43																			
	6/20/01	9:35	DT	24	2630	48	8.5	32	<0.05	1.1	0.612	0.01	61	10							
	6/21/01	8:35																			
	6/28/01		DT	1	2580	122	8.4	24	<0.05	1.7	0.826	0.138	140	20							

RMP WATERSHED SITES
San Diego Creek at Harvard

STATION	DATE	TIME	SAMPLES Type	#	EC mmhos	Turb NTU	pH	NO ₃ mg/L	NH ₃ mg/L	TKN mg/L	PO ₄ mg/L	o-PO ₄ mg/L	TSS mg/L	VSS mg/L	Field Measurements Date	Time	EC mmhos	pH	TEMP C	DO mg/L
WYLED	7/19/00	10:15	DT	1	2250	2.6	8.3	62	<0.05	0.84	0.0765	0.097	<10	<1	7/19/00	10:15	2100	8.2	26.2	9
	8/4/00	12:35	DT	1	2200	3.7	8.5	25	<0.05	1.1	0.367	0.028	10	<5	8/4/00	12:35	2010	8.4	29.4	
	8/16/00	14:58	DT	24	2140	9.1	8	53	<0.05	1.1	0.11	<0.01	24	<10	8/17/00	13:15	2200	8.5	31.6	
	8/17/00	15:58																		
	8/29/00	14:50	DT	24	1730	2	8.2	70	<0.05	0.53	0.223	0.03	<10	<10	8/29/00	13:50	2030	7.8	26.3	18.8
	8/30/00	13:50																		
	9/12/00	10:49	DT	24	2180	2.3	8.1	10	<0.05	0.93	<0.061	<0.01	<10	<10	9/13/00	9:05	2130	7.9	21.6	9.7
	9/13/00	9:49																		
	9/26/00	13:42	DT	24	2310	0.3	8.3	66	<0.05	0.88	0.337	0.077	<10	<10	9/27/00	11:55	1990	8.9	26.7	
	9/27/00	12:42																		
	10/5/00	11:32	DT	24	2000	3.5	8.3	57	<0.05	0.83	0.49	0.043	21	<10	10/6/00	11:00	1540	7.4	20.3	5.9
	10/6/00	10:32																		
	10/27/00	12:17	ST	5	1680	140	8.3	48	0.321	4.6	1.96	0.18	520	90						
	10/27/00	13:17																		
	10/26/00	15:17	ST	10	870	140	7.7	21	0.253	3.3	1.59	0.158	230	42						
	10/27/00	7:17	SF																	
	10/27/00	23:17	ST	17	1470	45	8	33	<0.05	1.6	1.13	0.203	51	12	10/29/00	9:10	1550	7.9	18.4	11.9
	10/29/00	8:17	SF																	
	10/29/00	10:17	ST	3	3110	6.2	8.2	43	<0.05	1.4	0.551		<10	<10						
	10/29/00	14:17	SF																	
	10/29/00	16:17	ST	11	1500	376	7.8	23	<0.05	2.1	2.72	0.267	600	64						
	10/30/00	12:17	SF																	
	10/30/00	14:17	ST	10	1970	53	7.8	31	0.101	1.4	1.04	0.243	52	<10						
	10/31/00	8:17	SF																	
	11/7/00	10:06	DT	24	2150	1.5	8.2	79	<0.05	0.64	0.306	0.041	<10	<10						
	11/8/00	9:06																		
	12/1/00	8:30	DT	1	2190	2	8	79	0.052	0.56	<0.061	0.025	<10	<10	12/1/00	8:30	1241	7.5	14.2	11.3
	12/14/00	9:42	DT	24	2070	4	8.5	84	<0.05	0.66	0.275	0.208	27	<10	12/15/00	9:45	1300	7.5	13.9	11
	12/15/00	8:42																		
	12/26/00	9:49	DT	24	1570	34	8.6	75	<0.05	4	1.71		150	28						
	12/27/00	8:49																		
	1/8/01	14:27	ST	5	935	160	7.2	30	1.33	7.9	3.67	0.19	360	68						
	1/8/01	15:27	SF																	
	1/8/01	17:27	ST		645	766	7.3	30	0.257	4.2	5.51	0.263	1150	150						
	1/9/01	1:27	SF																	
	1/9/01	9:27	ST	17	1610	40	8	53	0.46	1.5	1.25	0.53	42	<10						
	1/10/01	17:27	SF																	
	1/10/01	19:27	ST	23	455	390	7.8	17	0.317	2	3.37	0.4	750	80						
	1/12/01	13:27	SF																	
	1/17/01	8:42	DT	24	2030	6.4	8.1	62	<0.05	1.1	0.734	0.208	<10	<10	1/18/01	9:00	837	7.7	7.8	13.5
	1/18/01	7:42																		
	1/24/01	8:18	ST	5	1420	17	8	48	0.419	2.2	0.52	0.111	24	<10						
	1/24/01	9:18	SF																	
	1/24/01	11:18	ST	11	760	300	7.7	33	0.73	3.4	2.2	0.217	320	40						
	1/25/01	7:18	SF																	
	1/25/01	21:18	ST	13	1400	20	7.7	48	0.157	0.72	0.857	0.232	18	<10						
	1/26/01	9:18	SF																	
	1/26/01	11:18	ST	24	805	196	8	34	0.499	2.1	2.2	0.341	290	38						
	1/28/01	9:18	SF																	
	2/1/01	9:39	DT	24	2070	3.4	8.2	75	<0.05	<0.2	0.612	0.171	<10	<10	2/1/01		1329		10	5
	2/2/01	8:39																		

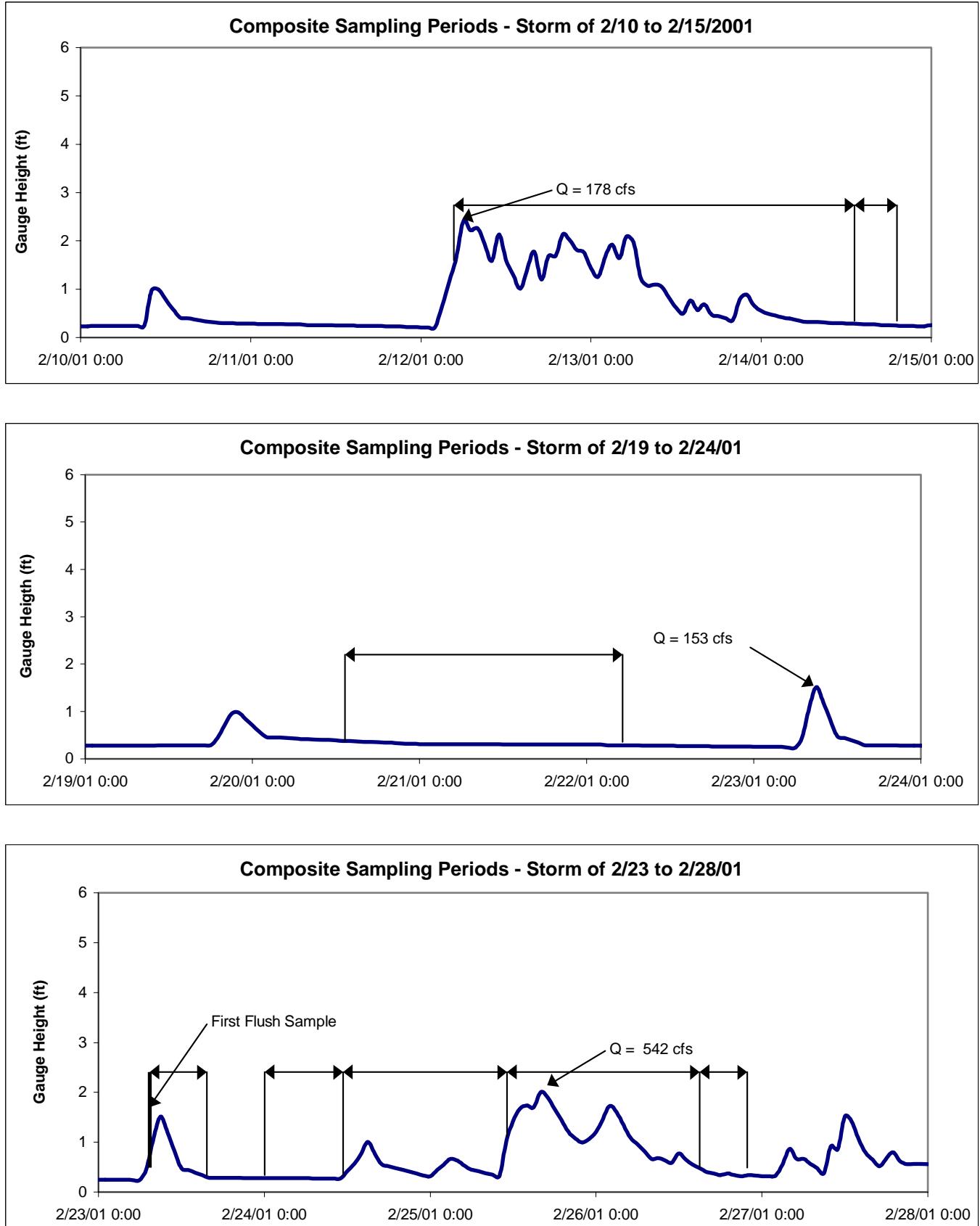
RMP WATERSHED SITES
San Diego Creek at Harvard

STATION	DATE	TIME	SAMPLES Type	#	EC mmhos	Turb NTU	pH	NO ₃ mg/L	NH ₃ mg/L	TKN mg/L	PO ₄ mg/L	o-PO ₄ mg/L	TSS mg/L	VSS mg/L	Field Measurements Date	Field Measurements Time	EC mmhos	pH	TEMP C	DO mg/L
WYLED	2/14/01		ST	24	1070	61	7.9	26	0.13	2.4	2.23	0.519	58	<10	2/15/01		1320	7.8	11.9	13.1
	2/15/01																			
	2/22/01	8:50	DT	24	1490	3	8.2	48	<0.05	0.63	0.673	0.195	<10	<10	2/22/01	8:50	1702	8.3	13.9	13.3
	2/23/01	7:50																		
	3/6/01	3:02	ST	5	924	55	7.6	29	<0.05	1	0.704	0.132	87	16						
	3/6/01	4:02	SF																	
	3/6/01	6:02	ST	13	656	190	7.4	18	0.076	1.5	2.2	0.304	290	40						
	3/7/01	6:02	SF																	
	3/20/01	9:02	DT	1	1670	6.3	8.2	48	<0.05	0.93	0.0918	<0.01	69	13	3/20/01	9:02	1839	8.1	19.4	16.3
	4/3/01		DT	24	2020	1.2	8.2	75	<0.05	1.1	0.337	0.078	<10	<10						
	4/4/01																			
	4/25/01	8:50	DT	24	1830	1.3	8	62	<0.05	0.64	0.0918	0.019	<10	<10	4/26/01		2141	8.1	19	14.8
	4/26/01	7:50																		
	5/16/01	10:00	DT	24	1920	3.4	8.3	70	<0.05	1.2	0.245	0.055	10	<10						
	5/17/01	9:00																		
	5/17/01	10:00	DT	5				70	<0.05	1.3	0.153									
	5/18/01	14:00																		
	5/18/01	10:00	DT	24	2010	1.9	8.2	79	<0.05	1.2	0.337	0.05	10	<10						
	5/19/01	9:00																		
	5/19/01	10:00	DT	24	1920	1.9	8.2	79	<0.05	1.1	0.337	0.056	<10	<10						
	5/20/01	9:00																		
	5/19/01	10:00	DUP	24	1970	3.4	8.2	79	<0.05	0.96	0.275	0.061	13	<10						
	5/20/01	9:00																		
	5/21/01	9:45	DT	1				79	<0.05	1.7	0.306									
	5/21/01	10:00	DT	24	1950	8.3	7.9	79	<0.05	1.6	0.337		67	23						
	5/22/01	9:00																		
	5/22/01	10:00	DT	24	1980	1.7	8	79	<0.05	0.6	0.306	0.058	<10	<10						
	5/23/01	9:00																		
	5/30/01	9:35	DT	24	1960	3	8.4	70	0.13	1.6	0.428	0.129	<10	<10	5/31/01		2391	8.1	22.4	12.3
	5/31/01	8:35																		
	6/7/01	9:05	DT		1960	1.8	8.2	79	<0.05	0.71	0.184	0.032	<10	<10						
	6/8/01	8:05																		
	6/14/01	9:11	DT	24	1950	1.5	8.2	66	<0.05	0.62	0.0949	<0.01	<10	<10						
	6/15/01	8:11																		

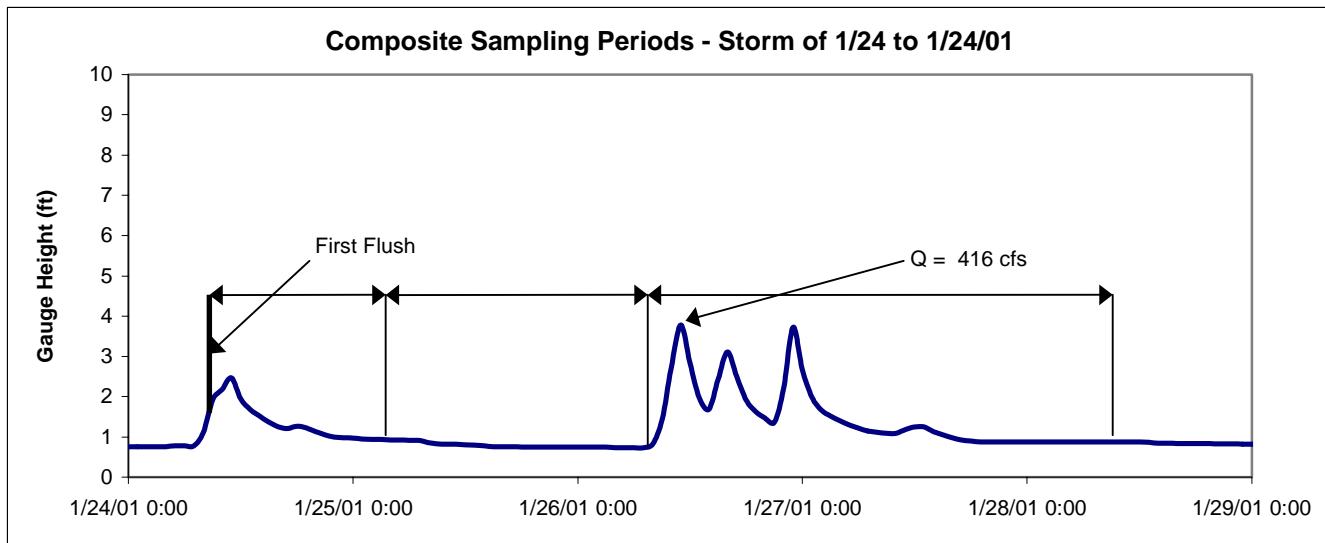
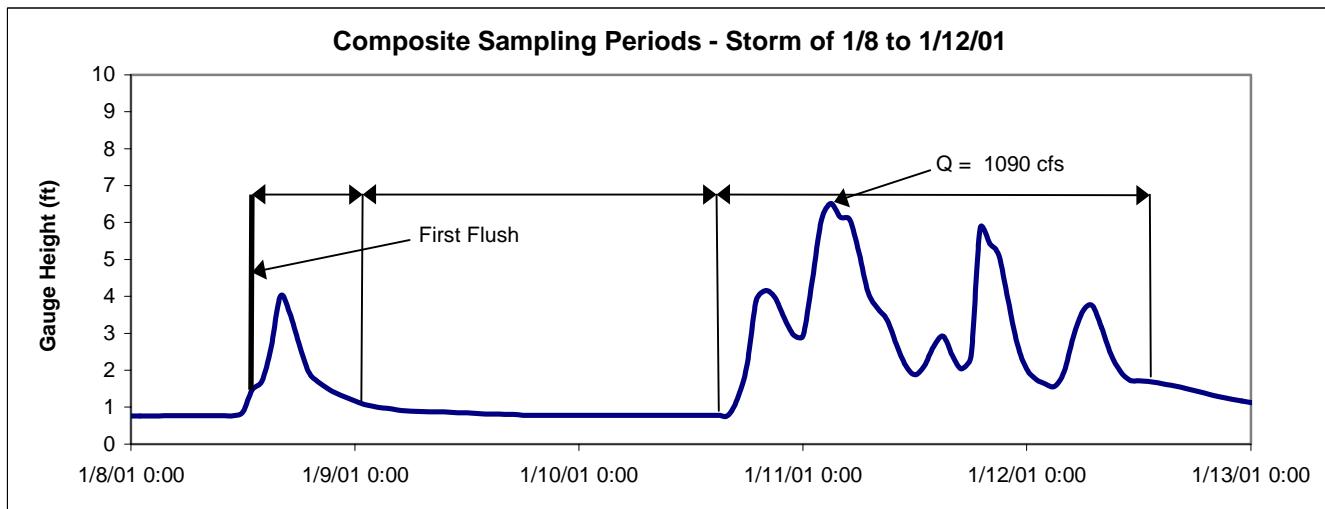
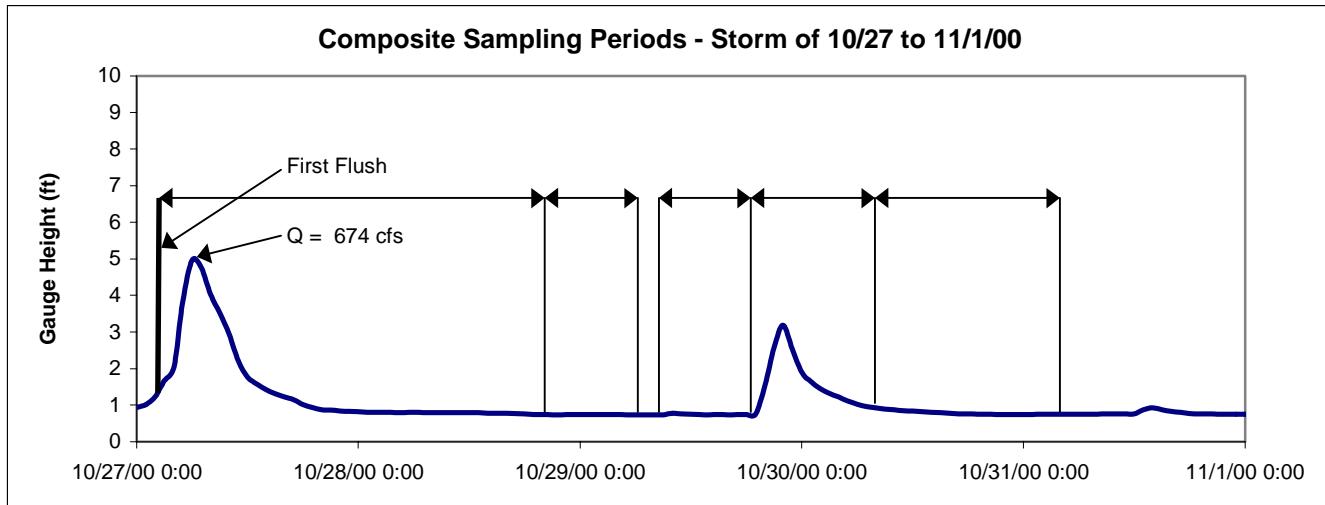
Appendix C

Storm Hydrographs

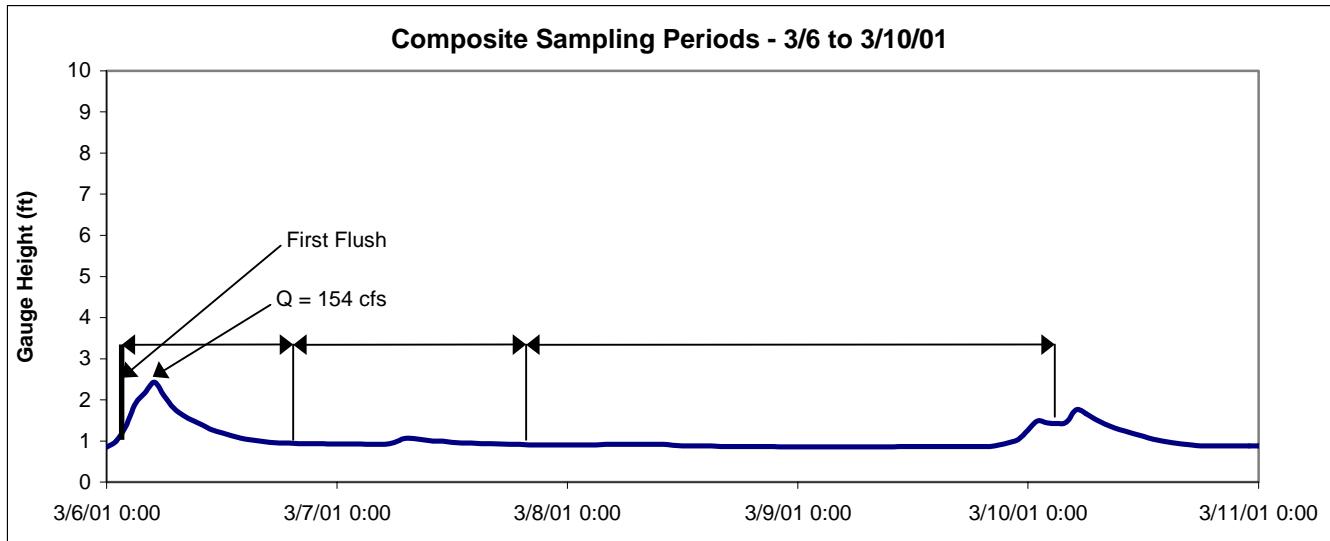
Stormwater Sampling in El Modena-Irvine Channel



Stormwater Sampling in Santa Ana Delhi Channel

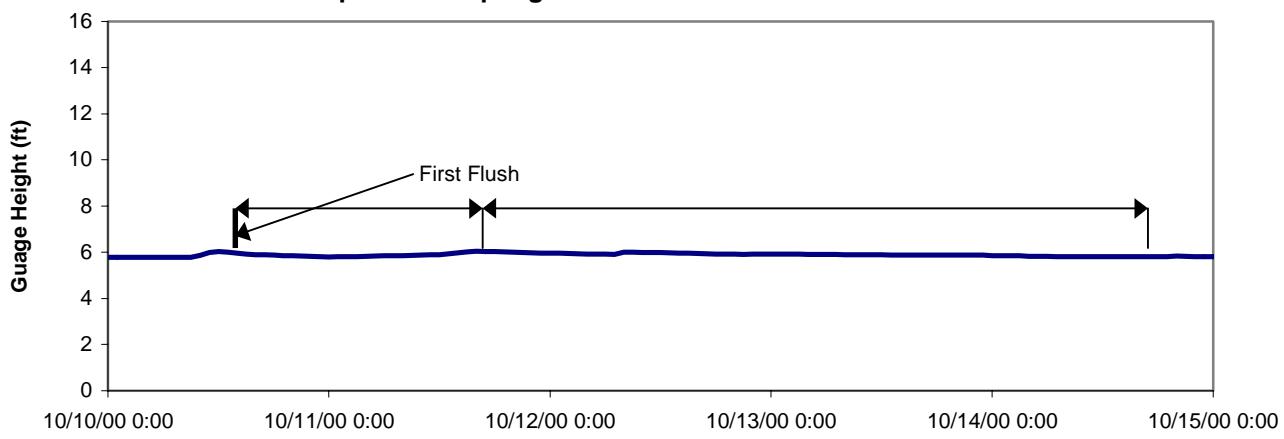


Stormwater Sampling in Santa Ana Delhi Channel

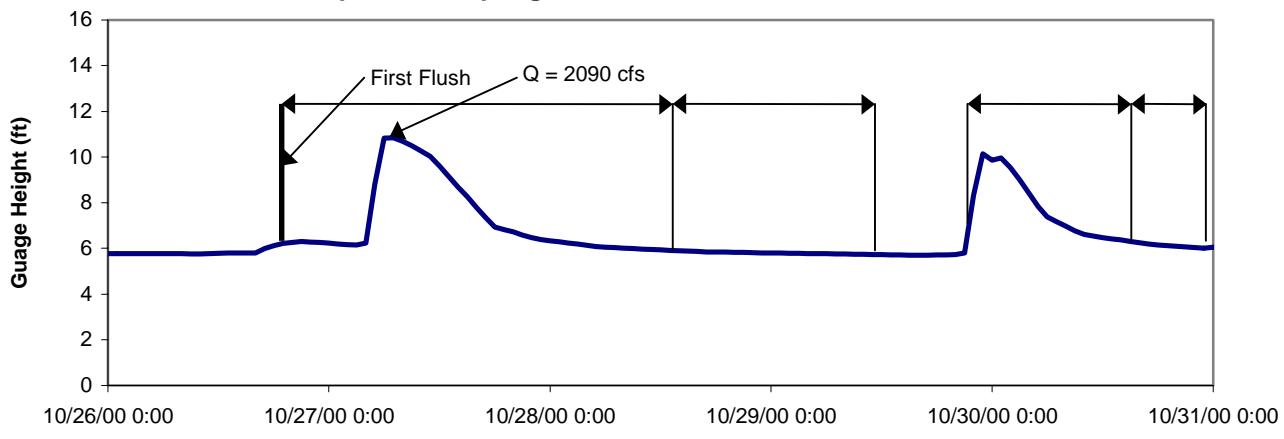


Stormwater Sampling in San Diego Creek @ Campus Drive

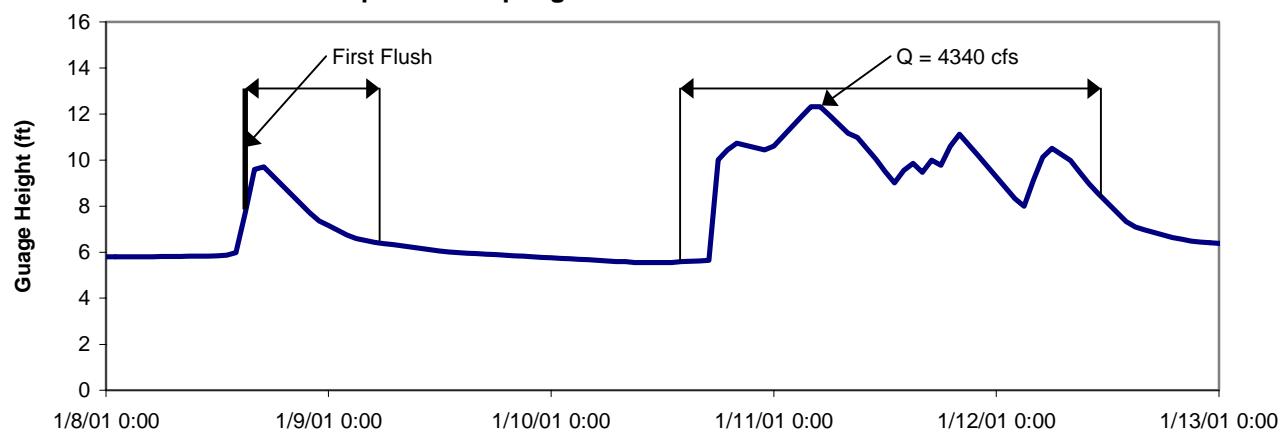
Composite Sampling Periods - Storm of 10/10 to 10/15/00



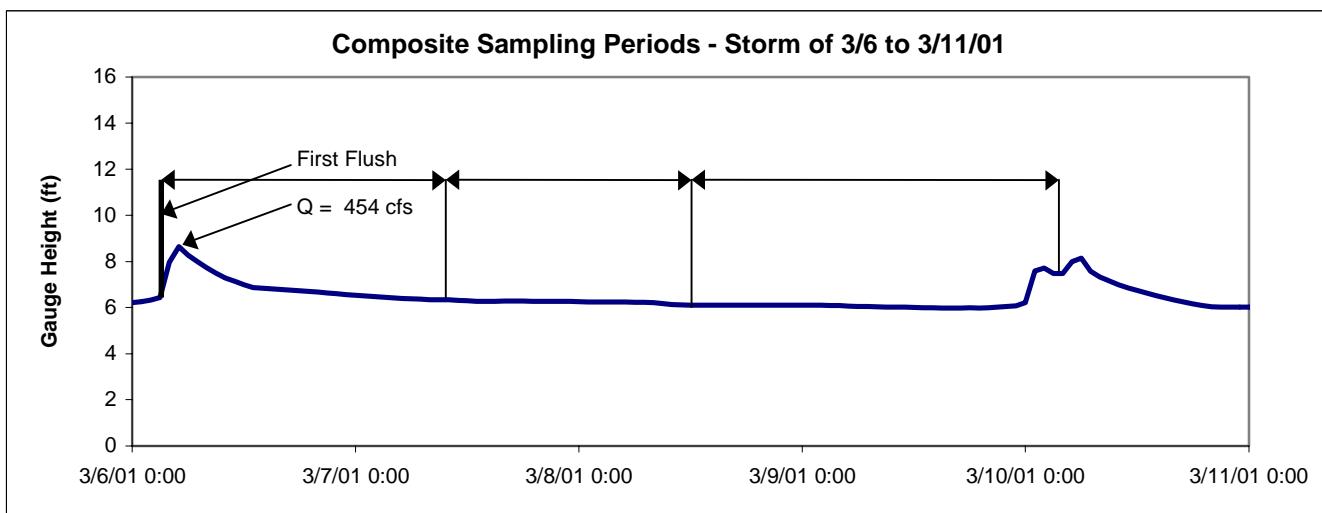
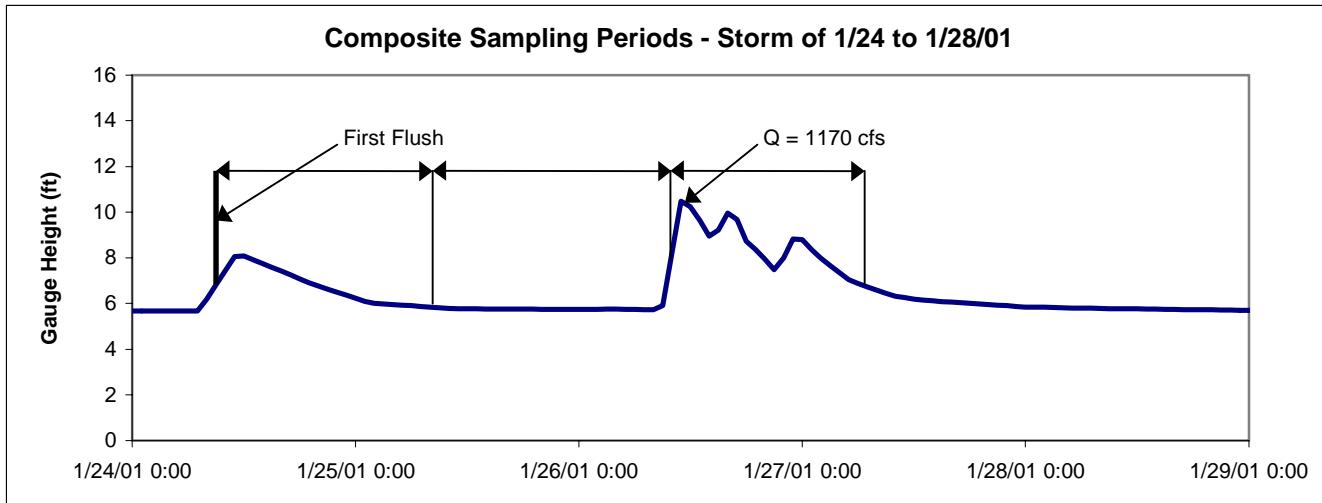
Composite Sampling Periods - Storm of 10/26 to 10/31/00



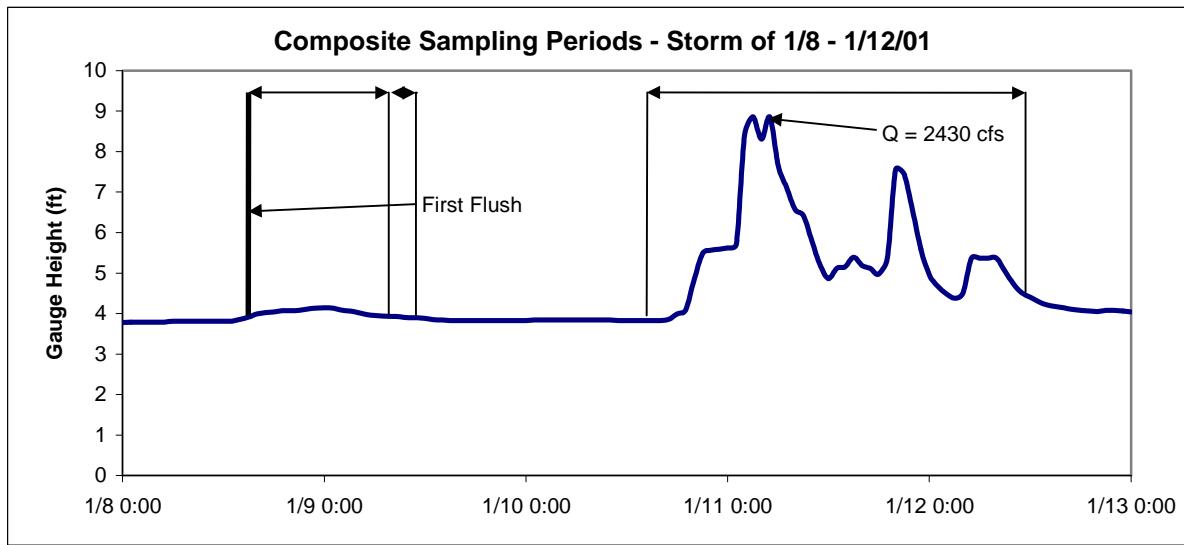
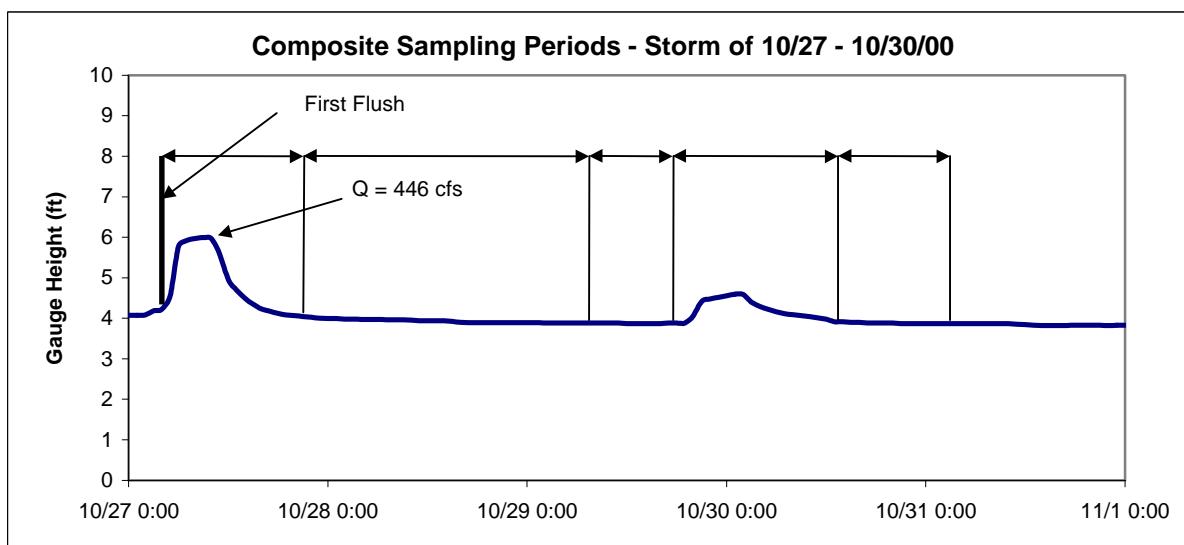
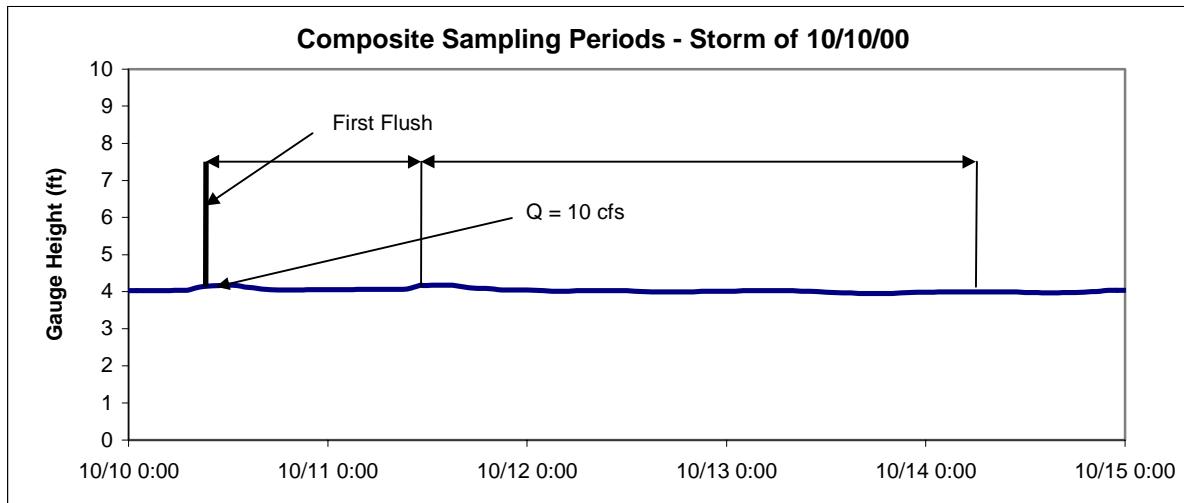
Composite Sampling Periods - Storm of 1/8 to 1/12/01



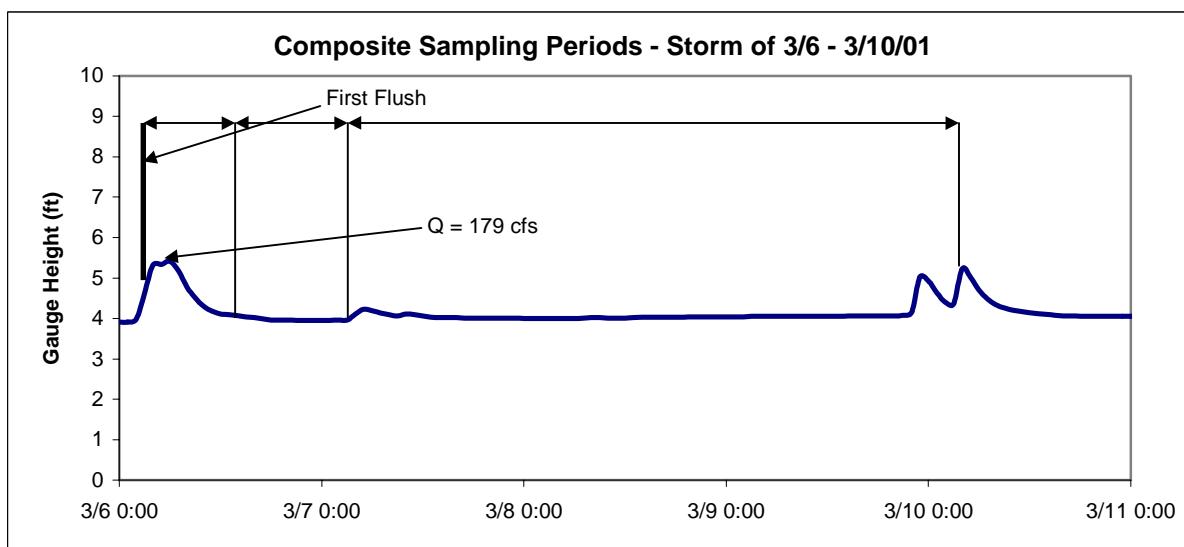
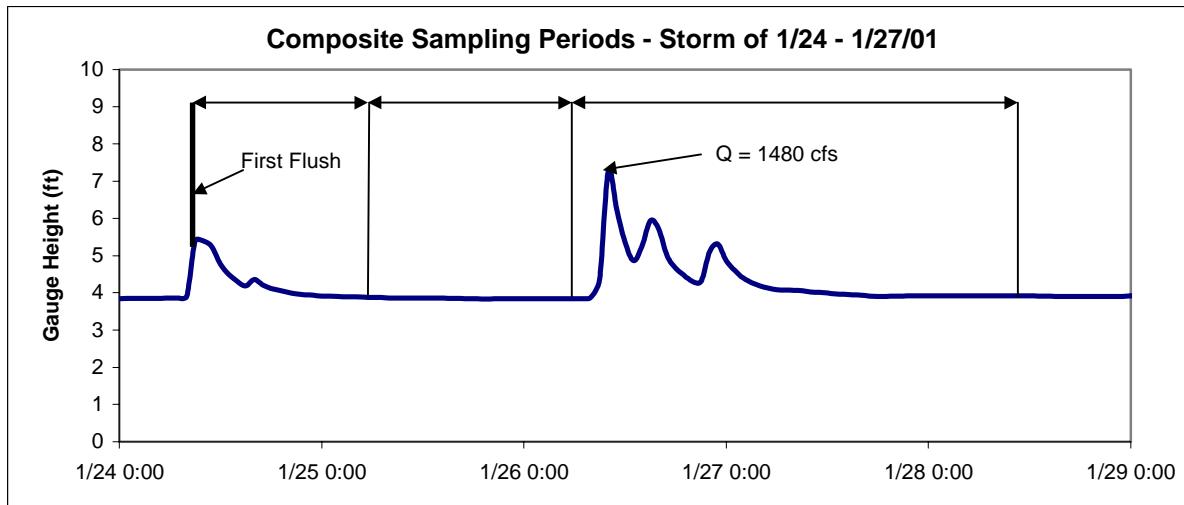
Stormwater Sampling in San Diego Creek @ Campus Drive



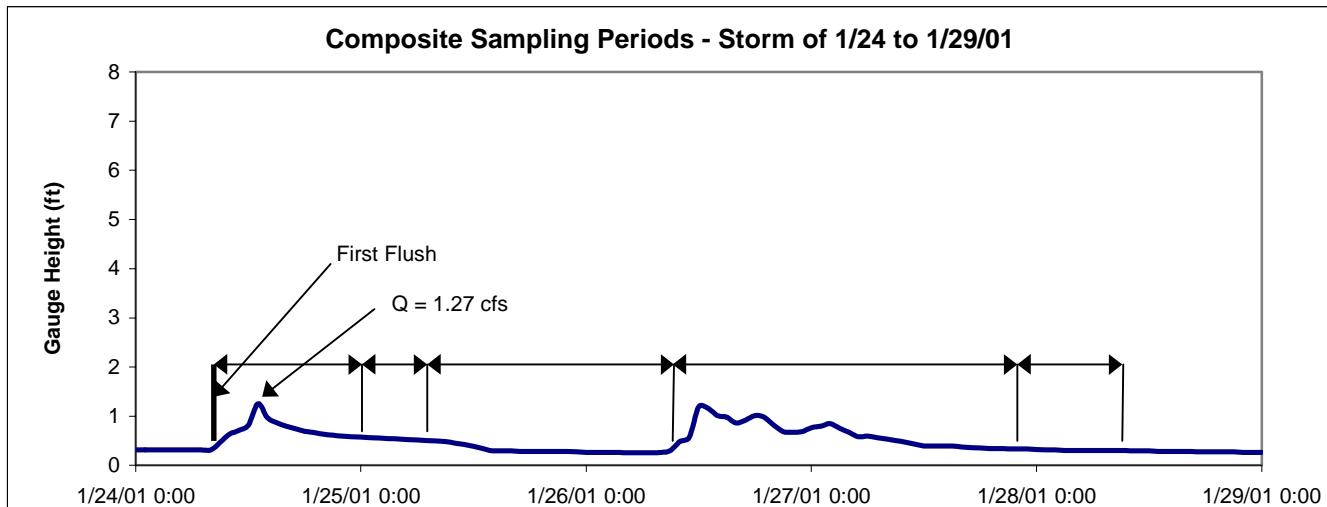
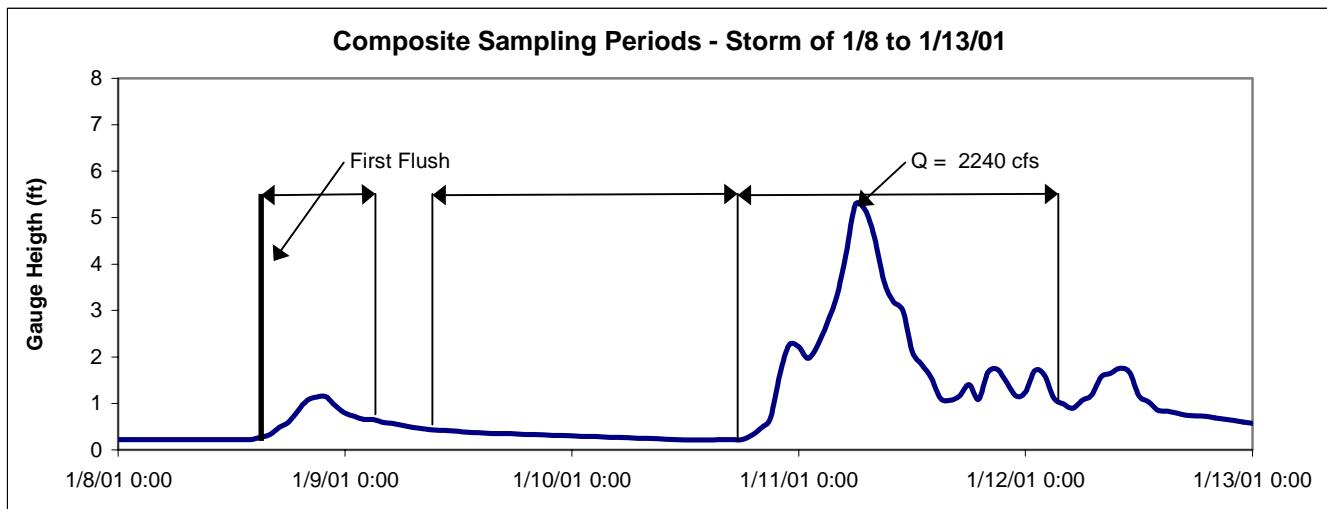
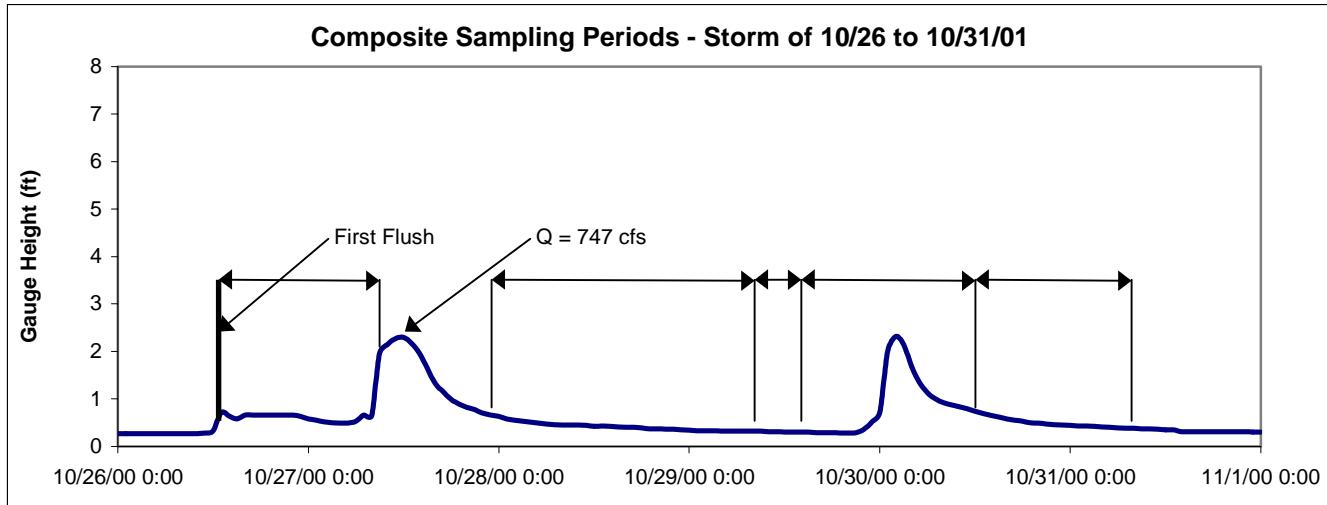
Stormwater Sampling in Peters Canyon Wash @ Barranca Parkway



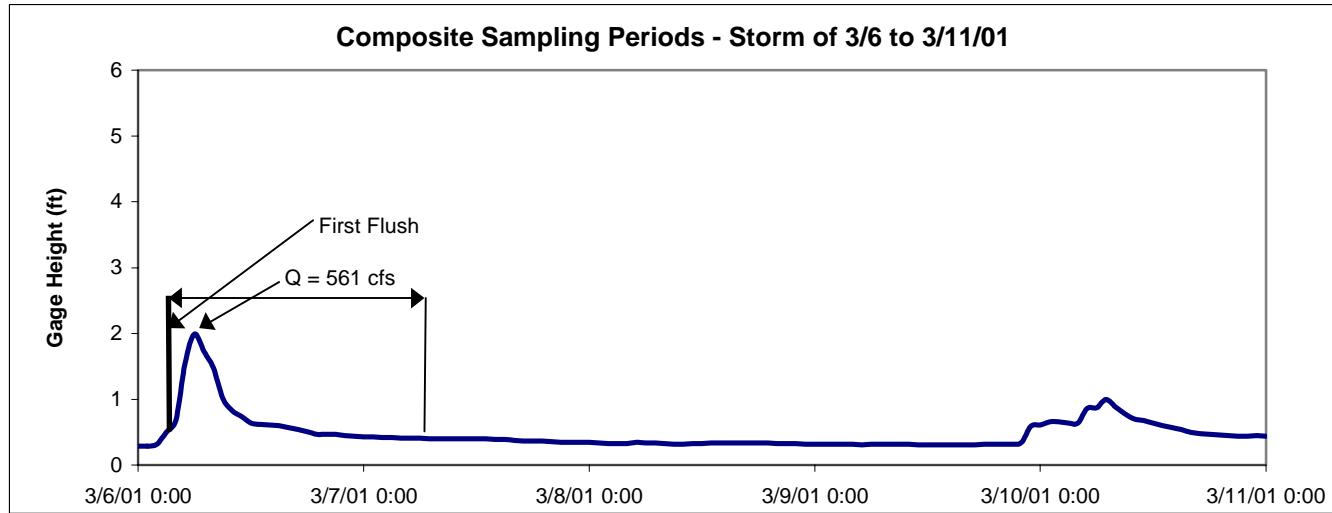
Stormwater Sampling in Peters Canyon Wash @ Barranca Parkway



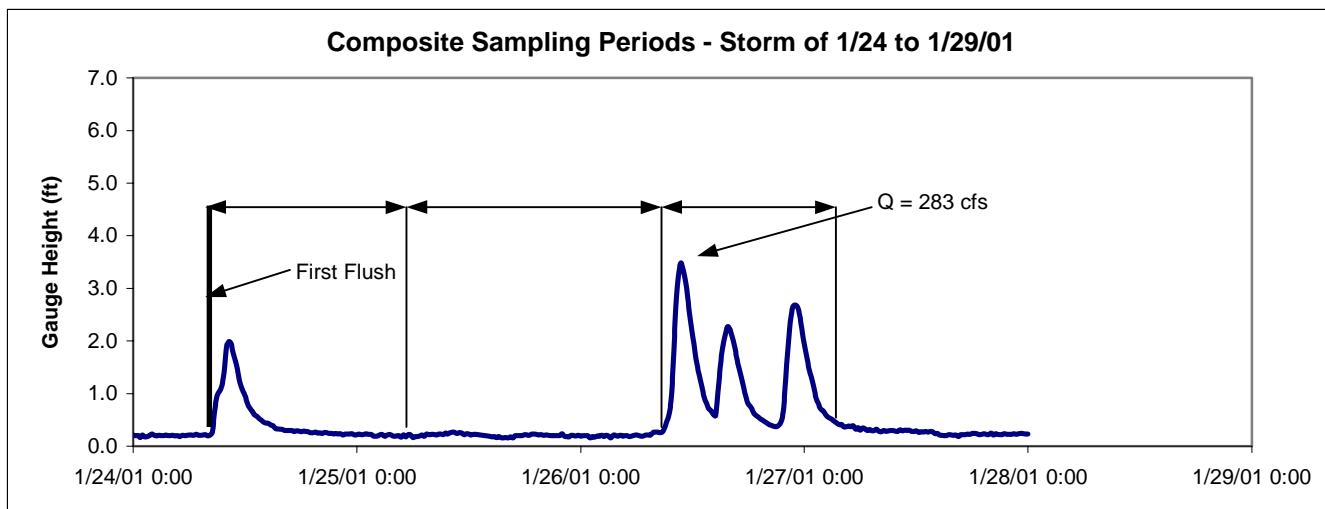
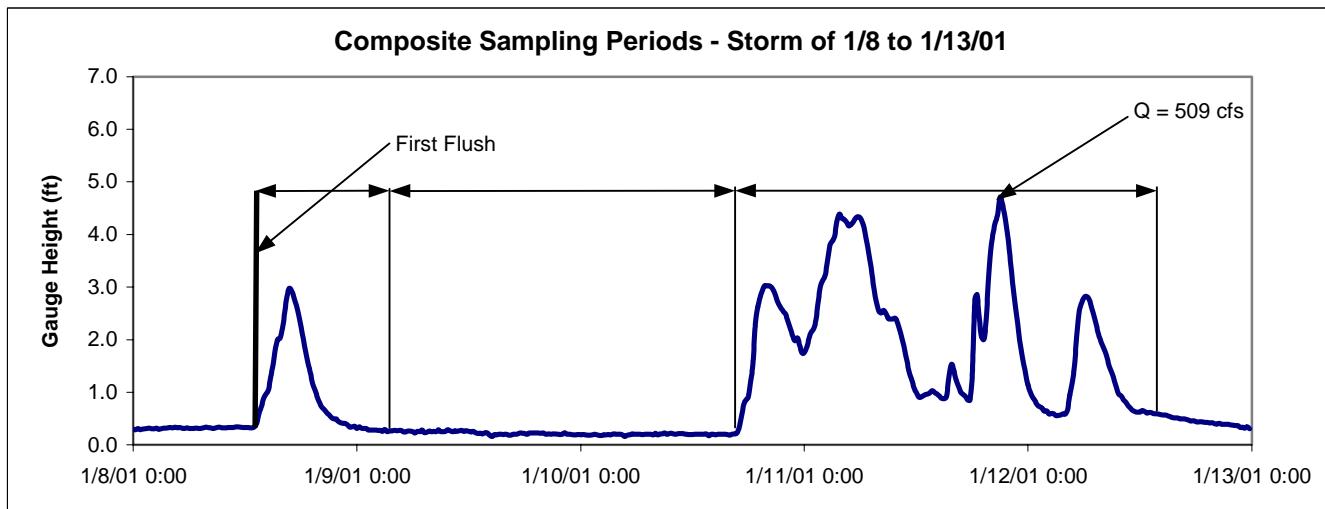
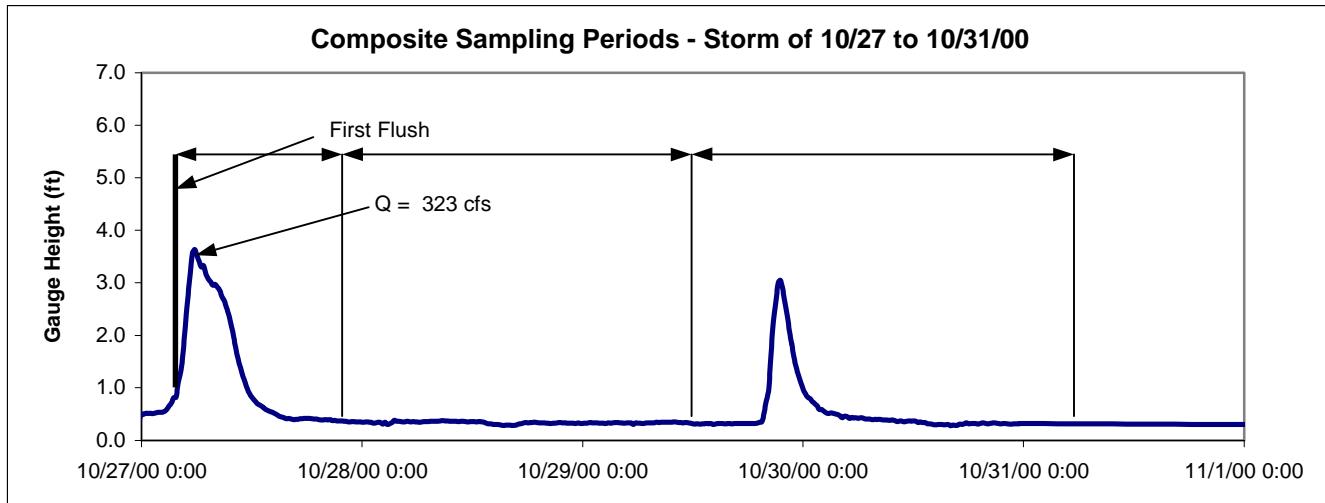
Stormwater Sampling in San Diego Creek @ Harvard Avenue



Stormwater Sampling in San Diego Creek @ Harvard Avenue

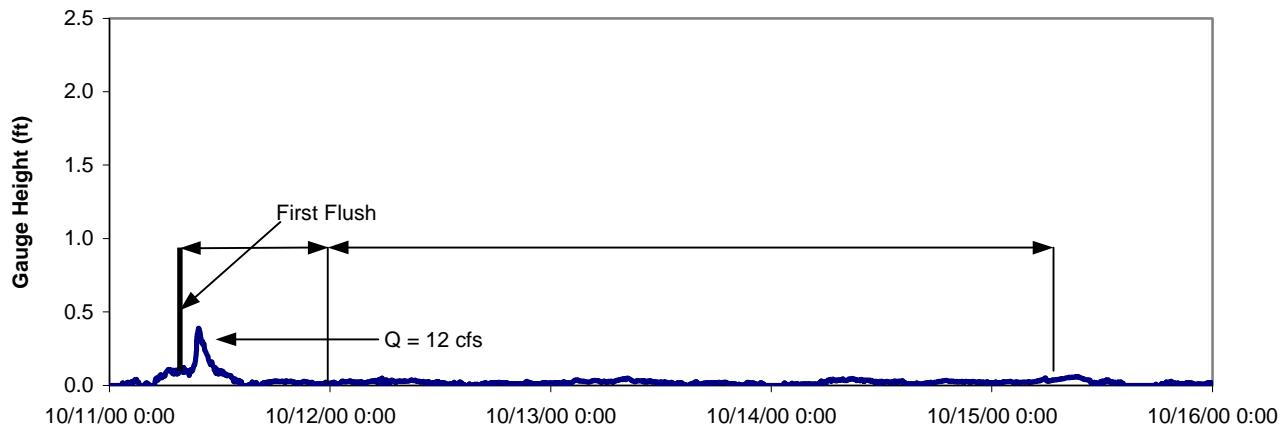


Stormwater Sampling in Lane Channel

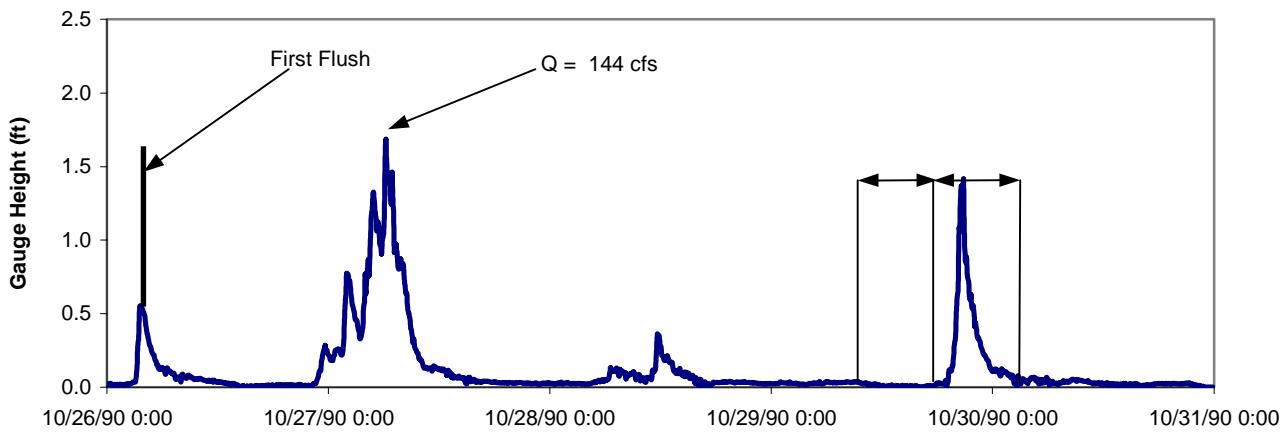


Stormwater Sampling in Costa Mesa Channel

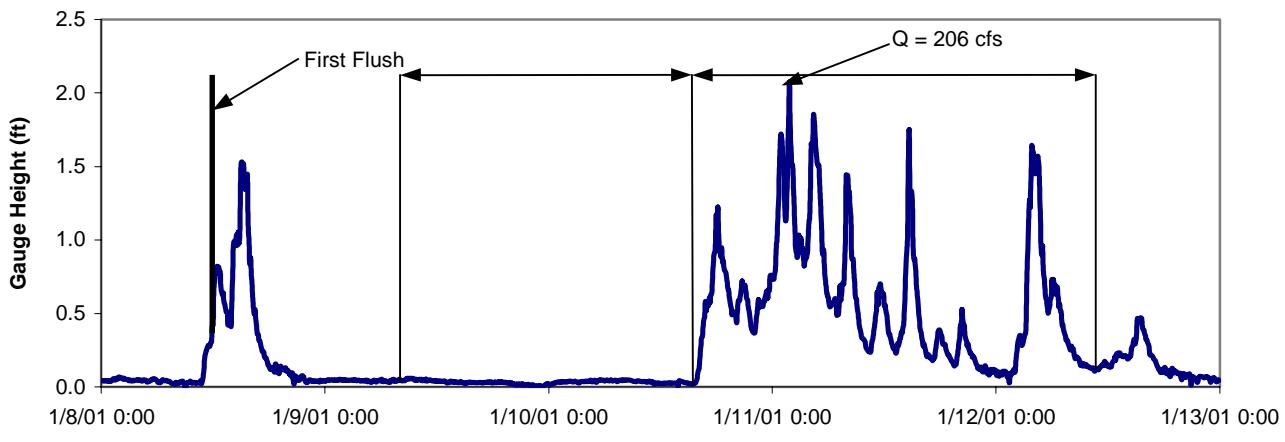
Composite Sampling Periods - Storm of 10/11 to 10/15/00



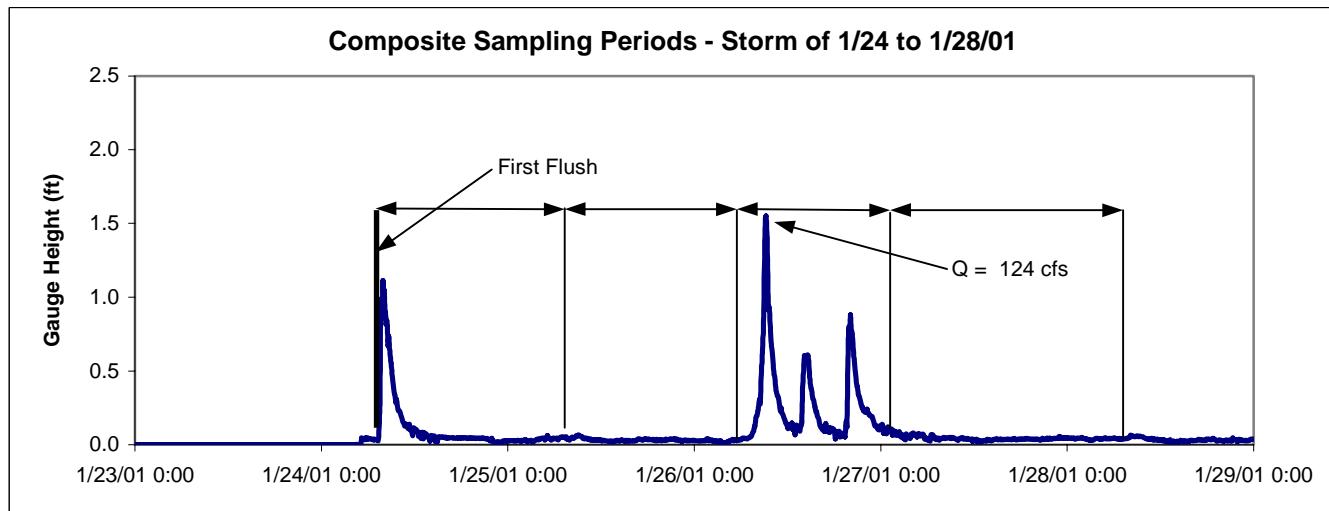
Composite Sampling Periods - Storm of 10/26 to 10/30/00



Composite Sampling Periods - Storm of 1/8 to 1/12/01



Stormwater Sampling in Costa Mesa Channel



Appendix D
Newport Bay Monitoring Data

RMP Bay Sites
Upper Newport Bay - Unit I Basin

STATION	DATE	TIME	SAMPLE	Maximum Depth	EC mmhos	Turb NTU	pH	NO ₃ mg/L	NH ₃ mg/L	TKN mg/L	PO ₄ mg/L	o-PO ₄ mg/L	TSS mg/L	VSS mg/L
			Depth	Depth (ft)										
UNBJAM	7/28/00	11:30	S		39800	4.5	8.3	<0.44	<0.05	0.92	0.459		15	7
	7/28/00		M		50800	12	8	<0.44	0.157	0.88	0.551		40	8
	7/28/00		B	9.8	49000	14	8	<0.44	0.2	0.85	0.428		38	7
	9/15/00	9:14	S		37400	17	8.1	6.6	0.288	1	0.673		32	<10
	9/15/00		M		47100	2.9	7.8	1.5	0.149	0.96	0.306		<10	<10
	9/15/00		B	3.28	48100	3.6	8	1.9	0.152	0.97	0.275		<10	<10
	9/29/00	8:23	S		37300	2.5	7.9	5.7	0.319	1	0.52		<10	<10
	9/29/00		M		49600	0.55	7.8	1.1	0.273	1.1	0.428		11	<10
	9/29/00		B	6.56	49800	0.6	7.8	1	0.263	0.99	0.428		<10	<10
	10/27/00	11:15	ST		6790	90	7.7	9.5	0.686	1.3	1.25		96	18
				3.28										
	10/29/00	11:50	ST		20700	7.5	7.5	10	0.631	1.3	0.918		<10	<10
	10/29/00			6.56										
	10/31/00	12:05	ST		13000	13	6.8	11	0.495	1.2	0.887		<10	<10
	10/31/00			13.1										
	11/17/00	9:43	S		42100	3.8	8	8	0.218	0.74	0.306		22	<10
	11/17/00		M		47100	2.4	8.1	2	0.155	0.78	0.245		28	<10
	11/17/00		B	13.1	48200	3.1	8.1	1.5	0.131	0.51	0.184		21	<10
	12/28/00	8:30	S		40500	6	7.9	6.6	0.24	0.68	0.254	0.065	48	<10
	12/28/00		M		49400	2.3	7.9	1.4	0.192	0.59	0.144	0.056	28	<10
	12/28/00		B	13.1	50200	3.6	7.9	1.1	0.179	0.73	0.19	0.052	32	<10
	1/11/01	9:40	ST		500	754	7.8	10	0.371	1.7	3.98	0.38	1090	110
	1/11/01			6.56										
	1/13/01	8:30	ST		3660	45	7.8	11	0.259	1.1	2.02	0.42	15	<10
	1/13/01			16.4										
	1/15/01	10:56	ST		16400	2.2	7	14	0.347	1.2	1.04	0.308	10	<10
	1/15/01			16.4										
	3/6/01	9:40	ST		14500	60	7.8	13	0.297	0.77	0.673		64	<10
	3/6/01			13.1										
	3/8/01	9:57	ST		17470	11	7.6	10	0.26	0.8	0.734		<10	<10
	3/8/01			6.56										
	3/10/01	10:55	ST		6010	25	8.6	35	0.117	1.3	0.551		16	<10
	3/10/01			6.56										
	3/29/01	11:30	S		37100	5.8	7.9	6	0.432	1.3	0.275		17	<10
	3/29/01		M		40040	6.8	7.8	3	0.484	1.2	0.337		<10	<10
	3/29/01		B	6.56	43500	7.5	7.8	1.7	0.509	1.1	0.428		21	<10

RMP Bay Sites
Upper Newport Bay - Unit I Basin

STATION	DATE	TIME	SAMPLE	Maximum Depth	EC mmhos	Turb NTU	pH	NO ₃ mg/L	NH ₃ mg/L	TKN mg/L	PO ₄ mg/L	o-PO ₄ mg/L	TSS mg/L	VSS mg/L
			Depth	Depth (ft)										
UNBJAM	4/30/01	12:00	S		31100	8.2	7.6	4.2	0.293	1.1	0.3		13	<10
	4/30/01		M		41670	7.3	7.7	0.76	0.316	1.3	0.398		24	<10
	4/30/01		B	9.84	42400	7.7	7.7	0.67	0.358	1.4	0.428		13	<10
	6/6/01	11:50	S		35210	4.5	7.9	5.9	0.167	0.95	0.306		<10	<10
	6/6/01		M		40640	5.3	7.8	3.4	0.221	0.89	0.275		<10	<10
	6/6/01		B	6.56	41300	8.2	7.9	2.2	0.188	0.94	0.275		15	<10
	6/27/01	13:00	S		38100	5.6	8.1	1.6	<0.05	0.76	0.184	0.089	13	<10
	6/27/01		M		41870	11	8	0.75	0.057	0.83	0.245	0.1	20	<10
	6/27/01		B	13.1	41400	18	8	<0.44	0.136	0.95	0.367	0.111	33	<10

RMP Bay Sites
Upper Newport Bay - Unit I Basin

Date	Time	Depth(m)	EC(µmhos)	Temp(C)	pH	DO(ppm)
7/28/00	11:30	0.0	41300	27.6	7.4	10.8
		1.0	48400	25.5	7.0	4.2
		2.0	49400	25.4	6.9	3.2
		3.0	50300	25.2	6.9	3.0
9/15/00	9:14	0.0	43820	23.6	8.1	6.1
		1.0	45910	23.6	8.1	6.1
9/29/00	8:23	0.0	46070	21.9	7.4	5.0
		1.0	48200	22.0	7.4	4.7
		2.0	49440	22.3	7.5	4.6
10/27/00	11:15	0.0	6570	7.1	8.5	7.6
		1.0	13320	17.4	8.2	5.7
		2.0	18790	17.7	8.1	5.8
10/29/00	11:50	0.0	25300	19.6	7.7	2.9
		1.0	39600	19.1	7.6	2.7
		2.0	41900	18.9	7.5	2.4
10/31/00	12:05	0.0	12412	20.0	8.6	6.1
		1.0	39880	19.3	7.9	4.7
		2.0	42210	19.1	7.9	3.9
		3.0	44290	19.0	7.9	4.9
		4.0	46310	18.9	7.9	4.4
11/17/00	9:43	0.0	41800	15.1	7.6	4.9
		1.0	45600	15.1	7.6	4.9
		2.0	47300	15.2	7.5	4.3
		3.0	48100	15.2	7.5	4.4
		4.0	48300	15.2	7.5	4.6
12/28/00	8:30	0.0	44900	10.8	6.3	5.1
		1.0	51800	12.8	7	4.6
		2.0	51810	13.0	6.1	3.2
		3.0	51600	13.1	6.7	2.9
		4.0	51170	13.4	6.5	2.3
1/11/01	9:40	0.0	650	11.1	6.6	10.2
		1.0	630	11.2	6.5	11.8
		2.0	650	11.2	6.2	13.8
1/13/01	8:30	0.0	4010	12.1	6.1	-
		1.0	5610	12.3	6.1	-
		2.0	27320	12.5	6.1	-
		3.0	31960	12.9	6.1	-
		4.0	33730	13.1	6.1	-
		5.0	34210	13.1	6.1	-

RMP Bay Sites
Upper Newport Bay - Unit I Basin

Date	Time	Depth(m)	EC(mmhos)	Temp(C)	pH	DO(ppm)
1/15/01	10:56	0.0	15600	12.6	6.2	UNK
		1.0	37850	13.5	5.6	UNK
		2.0	40250	13.7	5.9	UNK
		3.0	41750	13.8	5.8	UNK
		4.0	43790	14.0	5.9	UNK
		5.0	44410	14.0	6	UNK
3/6/01	9:40	0.0	17060	14.7	8.2	8.6
		1.0	22210	14.2	8	7.9
		2.0	22870	14.2	7.8	5.6
		3.0	26510	14.3	7.8	5.4
		4.0	46640	14.0	7.6	2.7
3/8/01	9:57	0.0	66570	16.0	7.1	2.2
		1.0	67600	15.3	7.1	2.2
		2.0	61620	15.3	7.1	1.5
3/10/01	10:55	0.0		16.7	7.2	
		1.0		15.8	7.04	
		2.0		15.1	7.1	
3/29/01	11:30	0.0	40230	19.7	7.8	6.12
		1.0	3700	19.5	7.7	4.9
		2.0	46200	19.3	7.7	4.9
4/30/01	12:00	0.0	28910	21.3	7.7	7.6
		1.0	30510	20.8	7.6	6.6
		2.0	39000	19.1	7.6	6.7
		3.0	39330	18.6	7.5	3.5
6/6/01	11:50	0.0	44300	23.1	7.8	6.8
		1.0	50910	22.2	7.6	5.5
		2.0	53640	21.8	7.6	4.1
6/27/01	13:00	0.0	95300	26.2	7.8	7.7
		1.0	100100	26.2	7.7	6
		2.0	99200	26.0	7.8	6.5
		3.0	106300	25.5	7.7	6
		4.0	108100	24.1	7.7	7.7

RMP Bay Sites
Upper Newport Bay - Unit II Basin

STATION	DATE	TIME	SAMPLE	Maximum Depth	EC mmhos	Turb NTU	pH	NO ₃ mg/L	NH ₃ mg/L	TKN mg/L	PO ₄ mg/L	o-PO ₄ mg/L	TSS mg/L	VSS mg/L
			Depth	Depth (ft)										
UNBSDC	7/28/00	11:00	S		43800	3.2	8.2	<0.44	<0.05	0.79	0.428		24	10
	7/28/00		M		47400	3.4	8.1	<0.44	<0.05	0.32	0.428		21	10
	7/28/00		B	3.28	49100	2.4	8.1	<0.44	<0.05	0.39	0.367		15	8
	9/15/00	9:39	S		51500	1.9	8	<0.44	0.097	0.71	0.184		<10	<10
	9/15/00		M		51800	2.6	8	<0.44	0.097	0.88	0.184		<10	<10
	9/15/00		B	9.84	51400	4.1	8	0.44	0.101	0.75	0.184		<10	<10
	9/29/00	8:49	S		52200	0.7	7.9	<0.44	0.132	0.73	0.245		<10	<10
	9/29/00		M		52700	0.8	7.9	0.44	0.127	0.81	0.275		<10	<10
	9/29/00		B	6.56	51600	0.8	7.9	<0.44	0.132	0.54	0.275		<10	<10
	10/27/00	10:50	ST		15200	60	8	9.5	0.617	1.2	1.01		62	12
				6.56										
	10/29/00	11:30	ST		33800	2.7	7.7	4.4	0.34	0.98	0.428		<10	<10
	10/29/00			16.4										
	10/31/00	12:30	ST		19800	7.4	7.7	7.9	0.412	1	0.734		<10	<10
	10/31/00			13.1										
	11/17/00	10:15	S		44600	2.6	8.1	4.8	0.172	0.67	0.245		29	<10
	11/17/00		M		49300	2.2	8.1	1.6	0.116	0.73	0.153		31	<10
	11/17/00		B	13.1	51100	2.1	8.1	1.2	0.096	0.74	0.122		29	<10
	12/28/00	8:00	S		49800	1.7	7.9	0.84	0.148	0.64	0.153	0.046	31	<10
	12/28/00		M		52100	1.9	8	0.66	0.125	0.5	0.15	0.039	27	<10
	12/28/00		B	13.1	53600	2.7	7.9	0.66	0.126	0.54	0.122	0.038	20	<10
	1/11/01	10:00	ST		700	440	7.8	8.2	0.387	0.99	2.42	0.303	360	40
	1/11/01			13.1										
	1/13/01	8:50	ST		6510	24	7.8	8.7	0.266	0.87	1.22	0.39	10	<10
	1/13/01			16.4										
	1/15/01	11:09	ST		17400	2.5	7.9	11	0.37	1.2	0.918	0.265	<10	<10
	1/15/01			6.56										
	3/6/01	10:00	ST		17900	38	7.8	13	0.322	0.67	0.673		43	<10
	3/6/01			6.56										
	3/8/01	10:18	ST		29650	3.4	7.8	4.9	0.138	0.52	0.367		12	<10
	3/8/01			3.28										
	3/10/01	11:20	ST		38500	5.1	8	3.9	0.117	0.83	0.214		23	<10
	3/10/01			9.84										
	3/29/01	12:00	S		41400	4.8	8	3	0.3	1	0.153		26	<10
	3/29/01		M		42100	12	8	2.7	0.312	1	0.214		32	<10
	3/29/01		B	6.56	42210	13	8	2.8	0.293	0.95	0.153		32	<10

RMP Bay Sites
Upper Newport Bay - Unit II Basin

STATION	DATE	TIME	SAMPLE	Maximum Depth	EC mmhos	Turb NTU	pH	NO ₃ mg/L	NH ₃ mg/L	TKN mg/L	PO ₄ mg/L	o-PO ₄ mg/L	TSS mg/L	VSS mg/L
			Depth	Depth (ft)										
UNBSDC	4/30/01	12:30	S		31500	13	7.9	4	0.267	1.4	0.398		19	<10
	4/30/01		M		34830	11	7.9	3.3	0.272	1.3	0.367		20	<10
	4/30/01		B	6.56	37230	7.5	7.9	2.7	0.269	1.5	0.337		27	<10
	6/6/01	12:20	S		40800	5	7.8	2.4	0.141	0.65	0.214		<10	<10
	6/6/01		M		43290	4.9	7.9	1.3	0.116	1	0.184		16	<10
	6/6/01		B	9.84	43500	11	7.9	1.1	0.096	0.77	0.153		36	<10
	6/27/01	12:30	S		38100	5.1	8.1	1.4	<0.05	0.67	0.153	0.063	23	<10
	6/27/01		M		42200	6.9	8.1	<0.44	0.075	1.2	0.275	0.07	12	<10
	6/27/01		B	13.1	42600	8.6	8.1	<0.44	0.091	0.84	0.245	0.073	16	<10

RMP Bay sites
Upper Newport Bay - Unit II Basin

Date	Time	Depth(m)	EC(mhos)	Temp(C)	pH	DO(ppm)
7/28/00	11:00	0.0	44100	26.2	7.1	5.4
		1.0	47200	25.3	7.0	4.9
9/15/00	9:39	0.0	42820	22.5	8.1	7.0
		1.0	49960	22.4	8.0	6.6
		2.0	50000	22.3	7.9	6.3
		3.0	50100	22.3	8.0	6.1
9/29/00	8:49	0.0	51520	21.7	7.7	8.3
		1.0	51520	21.6	7.7	7.3
		2.0	51530	21.6	7.7	7.2
10/27/00	10:50	0.0	12850	17.4	8.1	5.8
		1.0	15720	17.7	8.1	4.2
		2.0	23100	18.3	8.1	4.2
10/29/00	11:30	0.0	38700	19.3	7.6	3.0
		1.0	44600	19.0	7.6	3.3
		2.0	45200	19.1	7.6	3.0
		3.0	47300	18.9	7.6	3.1
		4.0	47000	18.6	7.6	2.9
		5.0	46700	18.7	7.6	2.9
10/31/00	12:30	0.0	23690	19.3	7.9	6.5
		1.0	41180	19.1	7.8	9.1
		2.0	48730	19.1	7.8	4.2
		3.0	49670	18.9	7.7	4
		4.0	49230	18.6	7.7	5.1
11/17/00	10:15	0.0	44200	14.7	7.6	5.2
		1.0	48600	15.0	7.4	5.3
		2.0	49700	15.3	7.5	5.1
		3.0	49700	15.0	7.6	5
		4.0	49000	15.2	7.5	5.1
12/28/00	8:00	0.0	51770	13.1	7.2	4.2
		1.0	52000	13.1	7.2	4.2
		2.0	52100	13.6	7.1	4.2
		3.0	52120	13.1	7.1	4
		4.0	52150	13.2	7	4.1
1/11/01	10:00	0.0	810	11.5	6.6	7.4
		1.0	940	11.9	6.7	8
		2.0	810	12.9	6.8	9.6
		3.0	7330	13.0	6.3	9.7
		4.0	33340	13.5	5.3	7.4

RMP Bay sites
Upper Newport Bay - Unit II Basin

Date	Time	Depth(m)	EC(mhos)	Temp(C)	pH	DO(ppm)
1/13/01	8:50	0.0	7030	10.1	7.2	-
		1.0	10690	10.9	7.2	-
		2.0	26710	11.9	7.2	-
		3.0	36490	12.6	7.2	-
		4.0	41270	13.3	7.2	-
		5.0	41500	13.7	7.2	-
1/15/01	11:09	0.0	15990	12.2	6.5	UNK
		1.0	35550	13.3	6	UNK
3/6/01	10:00	0.0	20180	14.9	8.2	6
		1.0	23150	14.6	8.2	5.9
		2.0	33970	14.4	8.1	5.3
3/8/01	10:18	0.0	66440	16.0	7.1	1.5
		1.0	67350	15.4	7.1	1.4
3/10/01	11:20	0.0		15.9	7.2	
		1.0		15.8	7.1	
		2.0		15.3	7.1	
		3.0		14.9	7.1	
3/29/01	12:00	0.0	45600	19.6	7.9	7.3
		1.0	48800	19.3	7.9	6.9
		2.0	45200	19.2	7.9	6.6
4/30/01	12:30	0.0	31200	21.0	7.7	7
		1.0	31289	22.0	7.8	6.7
		2.0	35240	20.6	7.7	6.4
6/6/01	12:20	0.0	51980	22.4	7.7	6.3
		1.0	53400	22.1	7.7	5.54
		2.0	54800	21.6	7.7	5.9
		3.0	55900	21.1	7.8	6
6/27/01	12:30	0.0	106100	24.7	7.8	8.2
		1.0	107100	23.9	7.8	5.3
		2.0	108200	23.8	7.8	5.3
		3.0	108000	23.7	7.7	4
		4.0	108200	23.1	7.6	3

RMP Bay Sites
Upper Newport Bay - North Star Beach

STATION	DATE	TIME	SAMPLE	Maximum Depth	EC mmhos	Turb NTU	pH	NO ₃ mg/L	NH ₃ mg/L	TKN mg/L	PO ₄ mg/L	o-PO ₄ mg/L	TSS mg/L	VSS mg/L
			Depth	Depth (ft)										
UNBNSB	7/28/00	12:20	S		49700	1.5	8.1	<0.44	<0.05	0.29	0.337		27	15
	7/28/00		M		50600	1.8	8.1	<0.44	<0.05	0.28	0.337		27	7
	7/28/00		B	9.8	49600	1.5	8.1	<0.44	<0.05	<0.2	0.245		25	15
	9/15/00	9:50	S		49100	3.1	8.1	<0.44	<0.05	<0.2	0.122		<10	<10
	9/15/00		M		52100	4.1	8.1	<0.44	<0.05	<0.2	0.0918		<10	<10
	9/15/00		B	13.1	51800	9.9	8.1	<0.44	<0.05	0.31	0.245		22	<10
	9/29/00	9:20	S		53600	0.9	8	<0.44	0.088	0.74	0.214		<10	<10
	9/29/00		M		52800	3.5	8	<0.44	<0.05	<0.2	0.214		<10	<10
	9/29/00		B	16.4	52400	3.6	8	<0.44	0.083	<0.2	0.245		<10	<10
	10/27/00	10:19	ST		42300	3.4	8.1	0.69	0.128	0.49	0.153		<10	<10
	10/27/00			19.68										
	10/29/00	11:10	ST		39500	2.1	7.9	2.6	0.17	0.72	0.22		18	<10
	10/29/00			13.1										
	10/31/00	11:35	ST		33300	2.6	7.8	5.7	0.303	1.2	0.398		<10	<10
	10/31/00			16.4										
	11/17/00	10:44	S		51200	2.3	8.1	0.75	0.062	0.62	0.122		14	<10
	11/17/00		M		52100	2.7	8.1	0.72	0.07	0.7	0.0918		24	<10
	11/17/00		B	9.84	50100	3.7	8.1	0.72	0.065	0.86	0.0918		23	<10
	12/28/00	7:32	S		51800	2.5	8	0.57	0.102	0.49	0.147	0.036	32	<10
	12/28/00		M		53800	2.7	8	0.53	0.096	0.63	0.141	0.033	25	<10
	12/28/00		B	16.4	54500	2.7	7.9	0.53	0.097	0.91	0.122	0.033	27	<10
	1/11/01	10:30	ST		2660	191	7.8	9.5	0.437	1.3	1.87	0.3	120	40
	1/11/01			16.4										
	1/13/01	9:15	ST		14600	14	7.9	7.3	0.253	0.67	0.979	0.37	10	<10
	1/13/01			16.4										
	1/15/01	11:50	ST		29600	1.9	3.1	6.3	0.351	1.4	0.796	0.205	18	<10
	1/15/01			6.56										
	3/6/01	10:27	ST		26720	17	7.8	10	0.26	0.76	0.49		19	<10
	3/6/01			13.1										
	3/8/01	10:38	ST		37700	8.5	8	2.4	0.134	0.54	0.275		21	<10
	3/8/01			6.56										
	3/10/01	11:35	ST		42060	5.1	8	1.5	0.097	0.78	0.184		31	<10
	3/10/01			13.1										
	3/29/01	12:45	S		42900	3.4	8.1	1.8	0.185	0.87	<0.061		12	<10
	3/29/01		M		45200	3.9	8.2	2.2	0.222	1	0.122		15	<10
	3/29/01		B	13.1	45140	2.3	8.2	<0.44	<0.05	0.64	<0.061		<10	<10

RMP Bay Sites
Upper Newport Bay - North Star Beach

STATION	DATE	TIME	SAMPLE	Maximum Depth	EC mmhos	Turb NTU	pH	NO ₃ mg/L	NH ₃ mg/L	TKN mg/L	PO ₄ mg/L	o-PO ₄ mg/L	TSS mg/L	VSS mg/L
			Depth	Depth (ft)										
UNBNSB	4/30/01	13:15	S		40200	2.9	7.9	1.6	0.212	1	0.202		<10	<10
	4/30/01		M		42100	3.7	7.9	0.69	0.153	1.1	0.162		13	<10
	4/30/01		B	6.56	43030	3.3	8	0.48	0.128	0.93	0.147		<10	<10
	6/6/01	13:10	S		43450	4.3	8	0.7	0.055	0.61	0.0918		18	<10
	6/6/01		M		43600	3.4	8	0.57	<0.05	0.73	0.0918		28	<10
	6/6/01		B	*UNK	45130	3.3	8	0.59	0.054	0.76	0.0918		11	<10
	6/27/01	12:00	S		41000	4.7	8.1	0.48	<0.05	0.63	0.184	0.056	29	<10
	6/27/01		M		42740	3.7	8.1	<0.44	<0.05	0.61	0.122	0.051	<10	<10
	6/27/01		B	6.56	43100	4.4	8	<0.44	<0.05	0.54	0.153	0.04	29	<10

*UNK - Unknown (YSI Probe failure)

RMP Bay sites
Upper Newport Bay - North Star Beach

Date	Time	Depth(m)	EC(mhos)	Temp(C)	pH	DO(ppm)
7/28/00	12:20	0.0	49500	25.4	7.2	5.7
		1.0	50800	24.4	7.1	5.8
		2.0	51600	24.0	7.1	6.0
		3.0	51900	23.8	7.1	6.0
9/15/00	9:50	0.0	50600	21.3	8.0	8.3
		1.0	51000	21.2	8.0	8.0
		2.0	51200	21.1	8.1	8.0
		3.0	53700	21.0	8.0	7.8
		4.0	5400	21.0	8.0	7.9
9/29/00	9:20	0.0	52140	21.4	7.9	8.5
		1.0	52170	21.4	7.9	8.6
		2.0	52180	21.3	7.9	8.7
		3.0	52170	21.3	7.9	8.7
		4.0	52180	21.3	7.9	9.0
		5.0	52180	21.3	7.9	9.3
10/27/00	10:19	0.0	39500	18.7	7.9	3.0
		1.0	40200	18.8	7.9	3.9
		2.0	40910	18.9	7.9	3.9
		3.0	41210	19.0	7.8	4.1
		4.0	41680	19.0	7.8	4.4
		5.0	41800	18.9	7.8	4.1
		6.0	41790	18.8	7.8	4.0
10/29/00	11:10	0.0	44300	19.1	7.6	3.9
		1.0	45700	18.9	7.6	3.7
		2.0	46200	18.7	7.6	3.9
		3.0	47900	18.6	7.6	3.6
		4.0	48700	18.6	7.5	3.7
10/31/00	11:35	0.0	34480	18.6	8.1	6.9
		1.0	45010	18.6	8.1	6.4
		2.0	47370	18.7	8	6.4
		3.0	49370	18.7	7.9	6.6
		4.0	50000	18.7	7.9	6.5
		5.0	50030	18.7	7.9	6.5
11/17/00	10:44	0.0	50200	14.9	7.6	4.8
		1.0	50200	14.9	7.6	4.8
		2.0	50300	15.0	7.7	4.8
		3.0	50200	15.0	7.5	4.7
12/28/00	7:32	0.0	52460	13.6	6.7	4
		1.0	52500	13.6	6.8	4
		2.0	52510	13.6	7	4.1
		3.0	52500	13.7	6.6	4.1
		4.0	52530	13.6	7	4.1
		5.0	52600	13.6	6.5	3.9

RMP Bay sites
Upper Newport Bay - North Star Beach

Date	Time	Depth(m)	EC(mhos)	Temp(C)	pH	DO(ppm)
1/11/01	10:30	0.0	2950	11.7	7	4.6
		1.0	3110	11.8	6.6	5.9
		2.0	4500	12.2	6.1	26.1
		3.0	22620	13.1	6	28.2
		4.0	42680	14.3	5.8	21.3
		5.0	43710	14.3	5.8	7.0
1/13/01	9:15	0.0	13600	10.8	7.2	
		1.0	29230	11.8	7.2	
		2.0	33470	12.5	7.2	
		3.0	41290	13.0	7.1	
		4.0	47650	13.8	7.1	
		5.0	48400	14.2	7.1	
1/15/01	11:50	0.0	28220	13.3	6.3	
		1.0	41050	13.8	6.2	
		2.0	44520	14.1	6.3	
3/6/01	10:27	0.0	30970	14.8	8.2	6.6
		1.0	31960	14.7	8.2	6.4
		2.0	32420	14.7	8.1	6.2
		3.0	33730	14.7	8.1	6.0
		4.0	33890	14.6	8.1	5.9
3/8/01	10:38	0.0	67690	15.3	7.2	1.6
		1.0	67760	15.2	7.2	1.7
		2.0	67790	15.2	7.2	1.8
3/10/01	11:35	0.0		15.2	7.2	
		1.0		15.2	7.0	
		2.0		15.2	7.2	
		3.0		15.2	7.2	
		4.0		15.2	7.2	
3/29/01	12:45	0.0	46410	19.2	8.0	8.6
		1.0	46930	18.8	8.2	8.2
		2.0	48800	17.7	8.1	9.3
		3.0	49100	17.7	8.1	9.3
		4.0	49200	17.7	8.1	9.3
4/30/01	13:15	0.0	37790	20.1	7.8	5.9
		1.0	38420	19.5	7.8	5.6
		2.0	39890	18.5	9.8	5.5
6/27/01	12:00	0.0	106100	24.7	7.8	5.1
		1.0	107100	24.0	7.8	5.0
		2.0	108200	23.2	7.8	4.9

RMP Bay Sites
Upper Newport Bay - Coast Highway Bridge

STATION	DATE	TIME	SAMPLE	Maximum Depth	EC mmhos	Turb NTU	pH	NO ₃ mg/L	NH ₃ mg/L	TKN mg/L	PO ₄ mg/L	o-PO ₄ mg/L	TSS mg/L	VSS mg/L
			Depth	Depth (ft)										
UNBCHB	7/28/00	10:15	S		51800	1.7	8.1	<0.44	<0.05	0.59	0.245		32	9
	7/28/00		M		53400	1.8	8.1	<0.44	<0.05	0.67	0.153		36	16
	7/28/00		B	9.8	52600	2	8.1	<0.44	<0.05	<0.2	0.153		35	11
	9/15/00	10:30	S		51200	6.8	8	<0.44	<0.05	0.75	0.0918		31	10
	9/15/00		M		50100	6.8	8.1	<0.44	<0.05	0.7	<0.061		10	<10
	9/15/00		B	9.8	52000	6.8	8.1	<0.44	<0.05	<0.2	0.0918		<10	<10
	9/29/00	9:50	S		51500	3	8	<0.44	0.051	0.64	0.214		<10	<10
	9/29/00		M		52200	10	8	<0.44	<0.05	0.54	0.184		35	<10
	9/29/00		B	9.8	50500	4.9	8	<0.44	<0.05	0.61	0.184		12	<10
	10/27/00	12:00	ST		42100	7.7	8	1.1	0.161	0.74	0.208		26	<10
	10/27/00			16.4										
	10/29/00	10:30	ST		42600	2.8	7.9	2	0.142	0.86	0.181		57	<10
	10/29/00			19.6										
	10/31/00	11:05	ST		37100	2.4	7.9	4.8	0.266	0.83	0.337		21	<10
	10/31/00			16.4										
	11/17/00	11:30	S		51400	2.8	8.1	0.46	<0.05	0.7	0.0918		24	<10
	11/17/00		M		51800	2.6	8.1	0.48	<0.05	0.64	0.0918		16	<10
	11/17/00		B	13.1	50400	3.4	8.1	0.45	<0.05	0.62	0.0918		33	<10
	12/28/00	9:30	S		53800	1.8	8	<0.44	0.063	0.52	<0.061	0.025	25	<10
	12/28/00		M		54100	1.9	8	<0.44	0.058	<0.2	<0.061	0.029	25	<10
	12/28/00		B	9.8	54400	1.5	8	<0.44	0.062	0.5	0.0857	0.025	32	<10
	1/11/01	10:50	ST		8910	71	7.7	9.3	0.446	0.77	1.13	0.154	50	14
	1/11/01			19.6										
	1/13/01	9:45	ST		22900	8.2	7.9	5.7	0.235	0.39	0.673	0.33	14	<10
	1/13/01			13.1										
	1/15/01	11:55	ST		41300	1.5	6.6	2.5	0.185	0.98	0.214	0.109	30	<10
	1/15/01			9.8										
	3/6/01	11:00	ST		33500	16	7.9	7.8	0.223	0.61	0.428		25	<10
	3/6/01			9.8										
	3/8/01	10:56	ST		40530	9.9	8	1.6	0.102	5.2	0.153		16	<10
	3/8/01			9.8										
	3/10/01	11:50	ST		44100	9	8.3	0.76	0.073	0.89	0.153		29	<10
	3/10/01			13.1										
	3/29/01	13:10	S		43700	5	8.2	<0.44	<0.05	0.73	<0.061		<10	<10
	3/29/01		M		45600	6.3	8.2	<0.44	<0.05	0.66	<0.061		<10	<10
	3/29/01		B	9.8	45640	5.9	8.2	<0.44	<0.05	0.61	<0.061		<10	<10

RMP Bay Sites
Upper Newport Bay - Coast Highway Bridge

STATION	DATE	TIME	SAMPLE	Maximum Depth	EC mmhos	Turb NTU	pH	NO ₃ mg/L	NH ₃ mg/L	TKN mg/L	PO ₄ mg/L	o-PO ₄ mg/L	TSS mg/L	VSS mg/L	
UNBCHB	4/30/01	14:00	S	13.1	43240	3.8	8	0.45	0.063	1.1	0.116		13	<10	
	4/30/01		M		44320	4.8	8	<0.44	0.051	0.99	0.122		<10	<10	
	4/30/01		B		42250	7	8.1	<0.44	<0.05	0.92	0.11		11	<10	
	6/6/01	13:35	S		44900	2.7	8	0.59	0.053	1	<0.061		<10	<10	
	6/6/01		M		45300	3.5	8	0.49	<0.05	0.76	0.0612		<10	<10	
	6/6/01		B		*UNK	46410	3	8	0.5	<0.05	0.6	0.0918		<10	<10
	6/27/01	13:40	S		43860	7.7	8	<0.44	<0.05	0.55	0.122	0.03	28	<10	
	6/27/01		M		46030	6.5	8.1	<0.44	<0.05	0.59	0.0918	0.028	18	<10	
			B	9.8	44580	7.9	8	<0.44	<0.05	0.62	0.0918	0.03	33	<10	

*UNK - Unknown (YSI Probe failure)

RMP Bay sites
Upper Newport Bay - Coast Highway Bridge

Date	Time	Depth(m)	EC(mhos)	Temp(C)	pH	DO(ppm)
7/28/00	10:15	0.0	52300	23.4	7.2	6.2
		1.0	52600	23.2	7.1	6.2
		2.0	52700	23.1	7.1	6.2
		3.0	52900	23.0	7.1	6.2
9/15/00	10:30	0.0	51350	20.6	8.0	8.3
		1.0	51400	20.5	8.0	7.9
		2.0	51500	20.8	8.0	8.0
		3.0	51900	20.5	8.0	7.9
9/29/00	9:50	0.0	52100	20.1	8	7.9
		1.0	52700	20.1	7.9	7.9
		2.0	52800	20.0	7.9	7.9
		3.0	52900	19.9	7.9	8.0
10/27/00	12:00	0.0	39000	18.8	7.8	4.0
		1.0	39210	18.8	7.8	4.7
		2.0	39090	18.8	7.8	3.9
		3.0	39650	18.7	7.7	3.9
		4.0	39210	18.7	7.7	3.9
		5.0	39700	18.8	7.7	3.8
10/29/00	10:30	0.0	46000	18.7	7.5	3.9
		1.0	47100	18.7	7.6	3.5
		2.0	48700	18.7	7.6	3.9
		3.0	49200	19.0	7.6	4.1
		4.0	50700	18.7	7.6	4.0
		5.0	50600	19.0	7.5	4.5
		6.0	50000	18.7	7.5	3.9
10/31/00	11:05	0.0	40700	18.2	8	6.5
		1.0	43720	18.3	7.9	7
		2.0	47110	18.6	7.9	6.9
		3.0	49230	18.6	7.9	6
		4.0	50640	18.4	7.9	5.7
		5.0	51220	18.3	7.9	6.2
11/17/00	11:30	0.0	50700	15.3	7.6	5.1
		1.0	50700	15.4	7.6	8.7
		2.0	50700	15.4	7.6	4.6
		3.0	50810	15.4	7.6	3.9
		4.0	50900	17.4	7.5	3.5
12/28/00	9:30	0.0	52100	13.8	6.5	7
		1.0	52220	13.8	6.6	4.9
		2.0	52730	13.8	7	3.2
		3.0	53000	13.8	6.5	2.2

RMP Bay sites
Upper Newport Bay - Coast Highway Bridge

Date	Time	Depth(m)	EC(mmhos)	Temp(C)	pH	DO(ppm)
1/11/01	10:50	0.0	8730	12.2	7	
		1.0	9580	12.7	6.9	
		2.0	29960	13.3	6.3	
		3.0	30730	13.4	6.3	
		4.0	30670	13.8	6.1	
		5.0	38210	14.0	6.1	
		6.0	48710	14.3	6.1	3.6
1/13/01	9:45	0.0	21030	11.3	7.2	
		1.0	25930	11.7	7.2	
		2.0	47310	12.9	7.1	
		3.0	49760	13.8	7.2	
		4.0	50000	14.4	7.1	
1/15/01	11:55	0.0	40390	14.2	6.5	
		1.0	43890	14.2	6.4	
		2.0	47700	14.5	6.4	
		3.0	49470	14.6	6.5	
3/6/01	11:00	0.0	36900	14.7	8.2	7.5
		1.0	37070	14.7	8.2	7.3
		2.0	38090	14.7	8.2	7.2
		3.0	39700	14.6	8.1	7.4
3/8/01	10:56	0.0	67920	15.1	7.3	1.4
		1.0	67920	15.1	7.2	1.9
		2.0	67920	15.1	7.2	2
		3.0	67930	15.1	7.3	8.7
3/10/01	11:50	0.0		15.0	7.2	
		1.0		15.0	7.1	
		2.0		15.0	7.1	
		3.0		15.0	7.1	
		4.0		15.0	7.1	
3/29/01	13:10	0.0	49900	17.9	8.09	9.8
		1.0	49900	17.6	8.1	9.3
		2.0	50100	17.5	8.1	9.2
		3.0	50000	17.4	8.1	9
4/30/01	14:00	0.0	40790	18.6	7.95	7.49
		1.0	40950	18.5	7.47	7.96
		2.0	41300	17.8	7.98	7.6
		3.0	41940	16.7	8.01	7.55
		4.0	41600	16.7	7.98	8.54
6/27/01	13:40	0.0	112200	23.1	7.7	5.5
		1.0	117300	23.0	7.7	5.9
		2.0	111300	23.2	7.7	6
		3.0	113200	23.0	7.7	8.3

RMP Bay Sites
Lower Newport Bay - Harbor Island Reach

STATION	DATE	TIME	SAMPLE	Maximum Depth	EC mmhos	Turb NTU	pH	NO ₃ mg/L	NH ₃ mg/L	TKN mg/L	PO ₄ mg/L	o-PO ₄ mg/L	TSS mg/L	VSS mg/L
			Depth	Depth (ft)										
LNBHIR	7/28/00	9:45	S		51200	2	8.2	<0.44	<0.05	0.2	0.184		17	13
	7/28/00		M		53500	6	8.2	<0.44	<0.05	<0.2	0.153		29	12
	7/28/00		B	19.6	53200	3	8.2	<0.44	<0.05	0.65	0.153		33	10
	9/15/00	11:00	S		51300	2.2	8.1	<0.44	<0.05	<0.2	0.0918		<10	<10
	9/15/00		M		52400	4.2	8.1	<0.44	<0.05	0.64	<0.061		11	<10
	9/15/00		B	19.6	53100	6.5	8.1	<0.44	<0.05	0.64	<0.061		19	<10
	9/29/00	10:20	S		51100	0.8	8	<0.44	<0.05	0.68	0.214		<10	<10
	9/29/00		M		51400	0.85	8	<0.44	<0.05	0.73	0.184		<10	<10
	9/29/00		B	22.9	52600	0.55	8.1	<0.44	<0.05	0.57	0.122		<10	<10
	10/27/00	12:15	ST		44100	2.2	8.1	0.58	0.106	0.7	0.0949		<10	<10
	10/27/00			22.9										
	10/29/00	9:00	ST		44100	1.9	7.9	2.5	0.156	0.66	0.171		14	<10
	10/29/00			22.9										
	10/31/00	10:48	ST		45200	1.8	8	2.9	0.187	0.8	0.214		<10	<10
	10/31/00			22.9										
	11/17/00	11:45	S		51200	2.4	8.1	0.6	<0.05	0.67	<0.061		32	<10
	11/17/00		M		52500	2.6	8.1	<0.44	<0.05	0.79	<0.061		32	<10
	11/17/00		B	22.9	50900	2	8.1	<0.44	<0.05	0.73	<0.061		29	<10
	1/11/01	11:10	ST		19100	34	7.8	7.9	0.39	0.6	0.734	0.138	19	<10
	1/11/01			22.9										
	1/13/01	11:00	ST		16100	8.1	7.8	6.9	0.278	0.62	0.765	0.32	<10	<10
	1/13/01			22.9										
	1/15/01	13:32	ST		39900	1.3	2.8	2.7	0.212	1.1	0.275	0.12	20	<10
	1/15/01			22.9										
	3/6/01	12:04	ST		35570	8	7.9	6.5	0.206	0.66	0.337		14	<10
	3/6/01			19.6										
	3/8/01	13:36	ST		39540	2.1	8	2.3	0.12	0.45	0.153		<10	<10
	3/8/01			16.4										
	3/10/01		ST		40730	3.5	8	1.8	0.087	0.73	0.153		29	<10
	3/10/01			16.4										
	3/29/01	13:45	S		45080	3.5	8.2	<0.44	<0.05	0.59	<0.061		<10	<10
	3/29/01		M		44840	5.6	8.2	<0.44	<0.05	0.69	<0.061		15	<10
	3/29/01		B	19.6	46600	6.6	8.2	<0.44	<0.05	0.64	<0.061		32	<10
	4/30/01	14:20	S		42300	1.8	8	0.56	0.093	0.85	0.132		<10	<10
	4/30/01		M		43920	12	8.1	<0.44	<0.05	0.78	0.125		23	<10
	4/30/01		B	19.6	39700	13	8.1	<0.44	0.053	1.2	0.459		22	<10

RMP Bay Sites
Lower Newport Bay - Harbor Island Reach

STATION	DATE	TIME	SAMPLE	Maximum Depth	EC mmhos	Turb NTU	pH	NO ₃ mg/L	NH ₃ mg/L	TKN mg/L	PO ₄ mg/L	o-PO ₄ mg/L	TSS mg/L	VSS mg/L
				Depth (ft)										
LNBHIR	6/6/01		S	*UNK	45090	3.5	8	<0.44	<0.05	0.64	0.0612		<10	<10
	6/6/01		M		45200	4.5	8	<0.44	<0.05	0.62	0.0612		<10	<10
	6/6/01		B		42360	0.15	5.6	4	0.178	0.93	1.62		14	<10
	6/27/01	15:00	S		44120	6.4	8.1	<0.44	<0.05	0.64	0.122	0.028	11	<10
	6/27/01		M		44400	5.2	8.1	<0.44	<0.05	0.55	0.122	0.016	27	<10
	6/27/01		B		45380	5.6	8.1	<0.44	<0.05	0.66	0.0612	0.013	21	<10

*UNK - Unknown (YSI Probe failure)

RMP Bay sites
Lower Newport Bay - Harbor Island Reach

Date	Time	Depth(m)	EC(mmhos)	Temp(C)	pH	DO(ppm)
7/28/00	9:45	0.0	52500	23.2	7.1	6.5
		1.0	52600	23.0	7.0	6.5
		2.0	52900	22.8	7.0	6.5
		3.0	53000	22.7	6.9	6.4
		4.0	53200	21.8	6.7	6.5
		5.0	53600	21.3	7.0	7.1
		6.0	53600	21.2	7.1	7.1
9/15/00	11:00	0.0	51200	21.8	8.0	8.8
		1.0	51410	21.2	8.0	8.7
		2.0	51900	20.7	8.0	8.5
		3.0	52000	20.3	8.0	8.5
		4.0	52200	20.2	8.0	8.5
		5.0	52300	20.2	8.1	8.6
		6.0	52400	20.1	8.1	8.7
9/29/00	10:20	0.0	52260	21.9	8.1	7.7
		1.0	52290	21.2	8.1	7.9
		2.0	52400	20.7	8.1	8.0
		3.0	52500	20.6	8.1	8.1
		4.0	52600	20.8	8.1	8.3
		5.0	52700	20.0	8.1	8.5
		6.0	52800	20.0	8.1	7.0
		7.0	52900	19.8	8.1	9.8
10/29/00	9:00	0.0	43000	18.6	7.5	3.6
		1.0	44900	18.6	7.4	4.0
		2.0	51200	18.6	7.4	4.0
		3.0	51200	18.6	7.3	4.1
		4.0	51200	18.6	7.2	5.0
		5.0	51100	18.6	7.1	5.2
		6.0	51100	18.6	7.1	5.2
		7.0	51000	18.6	7.1	5.4
10/27/00	12:15	0.0	39740	18.8	7.9	4.2
		1.0	42970	18.8	7.9	4.2
		2.0	42500	18.9	7.9	4.3
		3.0	42600	18.7	7.9	4.2
		4.0	41910	18.7	7.9	4.2
		5.0	42170	18.7	7.9	4.2
		6.0	41200	18.8	7.8	4.1
		7.0	43000	17.8	7.8	4.2
10/31/00	10:48	0.0	44850	18.6	7.9	6.6
		1.0	47450	18.7	7.9	6.7
		2.0	49570	18.8	7.9	7.1
		3.0	50670	18.6	7.9	6.4
		4.0	51100	18.5	7.9	7.7
		5.0	51800	18.3	7.9	7.7
		6.0	51900	18.1	7.9	7.4
		7.0	52000	18.0	7.9	7.5

RMP Bay sites
Lower Newport Bay - Harbor Island Reach

Date	Time	Depth(m)	EC(mmhos)	Temp(C)	pH	DO(ppm)
11/17/00	11:45	0.0	50100	15.3	7.6	5.6
		1.0	50200	15.4	7.6	6
		2.0	50900	15.4	7.6	5.4
		3.0	51060	15.3	7.6	4.6
		4.0	51110	15.2	7.6	4.5
		5.0	51000	15.4	7.6	4.8
		6.0	51000	15.4	7.6	4.8
		7.0	51000	15.3	7.6	4.1
1/11/01	13:10	0.0	18380	12.9	7.1	6.5
		1.0	29270	13.1	7.6	6
		2.0	35630	13.9	7	5.5
		3.0	47220	14.3	6.9	5
		4.0	48710	14.2	7	5.4
		5.0	49810	14.3	7	9.9
		6.0	49800	14.4	6.9	5.4
		7.0	50130	14.5	6.7	4.6
1/13/01	11:00	0.0	15730	11.2	7.2	-
		1.0	22710	11.3	7.2	-
		2.0	44920	12.9	7.2	-
		3.0	48710	14.3	7.1	-
		4.0	49670	14.8	7.1	-
		5.0	50000	14.8	7.1	-
		6.0	50000	14.6	7.1	-
		7.0	49900	14.0	7.1	-
1/15/01	13:32	0.0	38710	13.8	6.8	UNK
		1.0	41000	13.9	6.7	UNK
		2.0	45500	14.3	6.6	UNK
		3.0	50070	14.6	6.6	UNK
		4.0	50620	14.7	6.6	UNK
		5.0	50900	14.7	6.6	UNK
		6.0	51000	14.7	6.6	UNK
		7.0	51000	14.7	6.7	UNK
3/6/01	12:04	0.0	38230	14.9	8.1	6
		1.0	38630	14.8	8	5.9
		2.0	39970	14.7	7.9	6.4
		3.0	45630	14.5	7.9	6.4
		4.0	48830	14.3	7.9	6.1
		5.0	49540	14.2	7.9	7
		6.0	49790	14.1	8	6.5
		0.0	65290	16.7	7.8	3.3
3/8/01	13:36	1.0	65230	16.3	7.2	2.3
		2.0	66330	16.0	7.2	2.5
		3.0	66990	15.5	7.2	2.2
		4.0	67830	14.8	7.3	1.9
		5.0	68360	14.7	7.2	2

RMP Bay sites
Lower Newport Bay - Harbor Island Reach

Date	Time	Depth(m)	EC(mmhos)	Temp(C)	pH	DO(ppm)
3/10/01		0.0		15.6	7.3	
		1.0		15.6	7.2	
		2.0		15.6	7.2	
		3.0		15.6	7.2	
3/29/01	13:45	0.0	49900	18.6	8.1	9.8
		1.0	49900	18.1	8.1	9.7
		2.0	50100	17.7	8.1	9.8
		3.0	50300	17.4	8.1	9.6
		4.0	50400	17.1	8.1	9.1
		5.0	50600	16.7	8	8.7
		6.0	50600	16.6	8	8.2
4/30/01	14:20	0.0	40620	19.0	7.93	7.33
		1.0	41070	18.4	7.95	7.24
		2.0	41390	17.9	7.96	7.13
		3.0	41890	17.1	7.99	7.27
		4.0	41910	16.9	7.99	7.14
		5.0	42260	16.2	7.99	7.06
		6.0	42440	15.6	8	7.05
6/27/01	15:00	0.0	109700	24.9	7.8	7
		1.0	110800	24.3	7.8	6.1
		2.0	110900	23.7	7.8	6.5
		3.0	113000	23.6	7.7	6
		4.0	113100	23.5	7.7	5.9
		5.0	113000	22.9	7.7	5.9

RMP Bay sites
Lower Newport Bay - Harbor Island Reach

Date	Time	Depth(m)	EC(mhos)	Temp(C)	pH	DO(ppm)
3/10/01		0.0		15.6	7.3	
		1.0		15.6	7.2	
		2.0		15.6	7.2	
		3.0		15.6	7.2	
3/29/01	13:45	0.0	49900	18.6	8.1	9.8
		1.0	49900	18.1	8.1	9.7
		2.0	50100	17.7	8.1	9.8
		3.0	50300	17.4	8.1	9.6
		4.0	50400	17.1	8.1	9.1
		5.0	50600	16.7	8	8.7
		6.0	50600	16.6	8	8.2
4/30/01	14:20	0.0	40620	19.0	7.93	7.33
		1.0	41070	18.4	7.95	7.24
		2.0	41390	17.9	7.96	7.13
		3.0	41890	17.1	7.99	7.27
		4.0	41910	16.9	7.99	7.14
		5.0	42260	16.2	7.99	7.06
		6.0	42440	15.6	8	7.05
6/27/01	15:00	0.0	109700	24.9	7.8	7
		1.0	110800	24.3	7.8	6.1
		2.0	110900	23.7	7.8	6.5
		3.0	113000	23.6	7.7	6
		4.0	113100	23.5	7.7	5.9
		5.0	113000	22.9	7.7	5.9

Appendix E

An Analysis of the Decline of Nuisance Macroalgae (Seaweed) in
Newport Bay - Estuary : 1996-2001

DRAFT

AN ANALYSIS OF THE DECLINE OF NUISANCE MACROALGAE (SEAWEED) in NEWPORT BAY- ESTUARY, 1996-2001

Report to: Orange County Public Facilities & Resources Department

Alex Horne Associates

November 2001

AHA: 867 Bates Avenue, El Cerrito, California 94530. 510-525-4433 (FAX 510-527-1085) anywaters@aol.com

1. SUMMARY

Biomass and species of large attached macroalgae (seaweed) were measured in the intertidal zone of Upper Newport Bay during the estimated period of maximum biomass in mid-summer 1996-2001. Biomass, species composition and spatial patterns were assessed.

1.1. Biomass of seaweeds. The annual average macroalgae midsummer biomass index in Upper Newport Bay fell dramatically over the last six years. From an initial value of 1.8 kg/m² in 1966 seaweed biomass had fallen 58 % to 0.76 kg/m² by 2001. Nuisance seaweed in Upper Newport Bay gradually declined by 12-18 % in the first two years and fell by 47% after four years. The 1999 increase was attributed to ammonia released during dredging. If the dredging year is omitted, the regression ($R^2 = 0.993$) indicates that the entire decline in seaweeds was explained by the passage of time. The observed declines can best be explained by a gradual decline in nitrate flowing into the estuary from the San Diego Creek. Possible contributing factors are (i) the gradually increase in nitrate removal from the creek by the Irvine Ranch Water District's San Joaquin Marsh, (ii) lower than normal rainfall in 1999-2001 and (iii) the on-going efforts of the Santa Ana Regional Water Quality Board and environmental groups to reduce nitrate in the watershed. These factors will be examined in other reports.

1.2. Species distribution and distribution. Over an all six years, three genera of attached macroalgae; *Ulva* (sea lettuce), *Enteromorpha* (sea confetti) and *Centroceras* were common in Newport Bay. In general, *Ulva* was more dominant in the upper and middle sections of the estuary while *Enteromorpha* dominated in the most seaward section. Although abundant locally in the 1970s-1980s, growths of these three seaweeds are now uncommon in Lower Newport Bay between the PCH Bridge and the Ocean. The spatial pattern of biomass distribution in Upper Newport Bay over the five years showed that dense seaweed (> 1.3 kg/m²) was at first found at almost all stations (84%) above the Sculling Boat Club (Sta. #4-24). Perhaps not coincidentally, most of these stations were characterized by a soft muddy substrate relative to the firmer sand of stations 1-3. In 2000 dense biomass occurred in only 44% of stations 4-24 and was restricted to the two apparently most favorable sub-regions within the bay. Both of these areas were characterized by very soft mud: stations 10-13 in the extensive mud flats on the east side of the central Bay and 16-18, a narrow strip in the channel just upstream of the Salt Works Dike. For the lesser number of stations assayed in 2001, the earlier general patterns persisted but now only one site exceeded 1.3 kg/m². In terms of beneficial use impairment the extensive central section would exert the most effect on the bay due to its large size. Thus if further nutrient reduction is feasible, dredging of some of this large mudflat would probably suffice to restore any still unmet beneficial uses to the upper estuary.

1.3. Increase in seaweed in 1999. The six-year decline in nuisance seaweed was interrupted by the 1999 season where the highest ever mean biomass, 2.4 kg/m² was recorded. Dredging of rich organic sediments was carried out over the entire seaweed growth season in 1999. Dredging is known to release large amounts of ammonia that would stimulate seaweed growth and is most likely the reason for the aberrant 1999 seaweed increase.

2.0. METHODS

2.1. OBSERVATIONS AND COLLECTIONS

Macroalgae were collected on 28 July 1999, 31 July- 1 August 2000 in the same manner as in previous years (AHA, 1996, 1997, 1998). Seaweed samples in 1999 were collected at 22 of the 24 (1999) and 21 (2000) intertidal sites used previously. In 2001 a different system was instituted collecting in mid-summer only at 8 stations but collecting at 3 time (2001) and 4 times (2001). At these sites triplicate randomly located samples were harvested. Seaweed was collected by hand from quadrats of approximately 0.1 m² area, picked clean on any debris, washed in clean local seawater, spun damp dry in a field centrifuge, and immediately weighed on site using a field balance. Samples of seaweed needed for nitrogen and phosphorus content and dry weight analysis were treated similarly, enclosed in plastic bags, kept cool, and were delivered to the laboratory within a few hours of collection. Analysis of dry weight, nitrogen and phosphorus in samples was in accordance with Standard Methods (APHA, 1997).

3.0. RESULTS

3.1. UPPER NEWPORT BAY BIOMASS DISTRIBUTION AND SPECIES COMPOSITION

3.1.1. Biomass Distribution: 1999. The amount of fresh weight of macroalgae in each station is shown in Table 1 and Figure 1. The average biomass of all species of macroalgae in Upper Newport Bay in summer 1999 was 2.4 kg/m² as fresh weight if all 22 stations collected are used (Table 1). If only the stations in the main Upper Bay (4-24) are considered the 1999 mean biomass (Sta. 4-24) is 2.6 kg/m². The range of sample biomass estimates from all 66 collections was 0.008 – 8.5 kg/m² and for the 22 station means the range was 0.008 – 7.4 kg/m². Peak biomass occurred in station 16 (Fig. 2). This site faces downwind (downstream) of large open water and the high biomass may have been enhanced with drift weed. However, little drift weed was observed in the open water and the seaweed found in station 15 appeared healthy, indicating it had not drifted in several days previously.

3.1.2. Species composition: 1999. The percentage of the major algal species was also estimated from each quadrat and is shown in Table 1. In Upper Newport Bay, as in past years, three genera of attached macroalgae, the two green genera *Ulva* (sea lettuce), *Enteromorpha* (confetti) and the small brown form *Centroceras* were common in Newport Bay. In July 1999, *Ulva* and *Enteromorpha* were both common, with *Ulva* present in 51 samples (82%) and *Enteromorpha* present in 47 or 48 samples (76% or 77%). At station 24, *Enteromorpha* was possibly present although another filamentous alga was present making identification uncertain. *Ulva* dominated seaweed biomass in 35% of samples, and *Enteromorpha* dominated in 53% of samples. *Ulva* and *Enteromorpha* were co-dominant in 5% of the samples. *Centroceras* dominated two samples (3%) and was co-dominant with *Ulva* in 1 sample (2%). Two samples were dominated by an unknown filamentous alga, likely *Cladophora*. *Enteromorpha* tended to dominate at both ends of the estuary (stations 1 – 8 and 21-22) while *Ulva* tended to dominate in the middle stations (9-20).

3.2.1. Biomass Distribution: 2000. The amount of fresh weight of macroalgae in each station is shown in Table 2. The average biomass of all species of macroalgae in Upper Newport Bay in summer 2000 was 0.96 kg/m^2 as fresh weight if all 21 stations collected were used (Table 2). If only the stations in the main Upper Bay (4-24) are considered the 2000 mean biomass (Sta. 4-24) was kg/m^2 . The range of individual sample biomass estimates from all collections was $0.02 - 3.7 \text{ kg/m}^2$ and for the 21 station means the range was $0.02 - 2.1 \text{ kg/m}^2$. Peak biomass occurred at stations 13 and 18. These sites have always provided good habitat for intertidal seaweeds, although they were not always more productive in previous years. Unlike previous years, algae at the stations with most biomass did not appear to be healthy, and had a yellow-green rather than a brighter green hue. This yellow color often indicates a lack of nitrogen in the plant.

3.2.2. Species composition: 2000. In 2000 species composition changed in the estuary, especially at the lower end furthest away from the San Diego Creek inflow. There was only a trace of intertidal algae growing in this region from the PCH Bridge to the Black Sail Beach Club. Some dying ocean kelp was found that had drifted in from the open sea. Of the small amount of living attached algae present, *Enteromorpha* was absent from the lowest regions of the estuary and was replaced by the filamentous green algae *Cladophora*. In the lower section of the estuary *Enteromorpha*, *Centrocerus* and *Cladophora* occupied almost entire sites in a patchy fashion with no clear order to dominance. *Ulva* did not appear in 2000 until station 9.

3.3.1. Biomass Distribution: 2001. The amount of fresh weight of macroalgae in each station is shown in Table 3. The average biomass of all species of macroalgae in Upper Newport Bay in summer 2001 was 0.76 kg/m^2 as fresh weight for the reduced number of stations (8) used (Table 3). The range of individual sample biomass estimates from all collections was $0.003 - 2.63 \text{ kg/m}^2$ and for the 8 station means the range was $0.019-2.01 \text{ kg/m}^2$. Peak biomass occurred at station 7 and the next two highest values were at stations 16 and 19. These sites have always provided good habitat for intertidal seaweeds, although station 16 can be influenced by drift accumulation of *Enteromorpha*.

3.3.2. Species composition: 2001. The percentage of the major algal species was also estimated from each quadrat and is shown in Table 3. As in all six years of quantitative record, three genera of attached macroalgae, the two green genera *Ulva* (sea lettuce), *Enteromorpha* (confetti) and the small brown form *Centroceras* were common in Newport Bay. The *Cladophora* that had been common in a few sites in 2000 was not found in any quantity in mid summer 2001. At the index time, in July 2001, *Ulva* and *Enteromorpha* were both common, with *Ulva* present in 20 samples (83%) and *Enteromorpha* present in 23 samples (96%). *Ulva* each dominated seaweed biomass in half of the sample and *Enteromorpha* dominated in the other half. *Ulva* and *Enteromorpha* were co-dominant in only 1 (4%) of the samples. *Centroceras* was usually present in small amounts (~ 5%) and reached 30% of the biomass in only one sample at station 24 at the uppermost end of the estuary. *Enteromorpha* tended to dominate at both ends of the estuary (stations 2 – 7 and 24) while *Ulva* tended to dominate in the middle stations (9-19).

3.4. RELATIVE CHANGES IN NUISANCE SEAWEEDS 1996-2001

The percentages changes from year to year and across years are shown in Table 4. The overall decline in the simple mean (all data from all stations averaged) was 58% between 1996 and 2001 (Table 1). The mean seaweed biomass for all stations declined about 10% per year between 1996 and 1998, but increased by about 60% percent between 1998 and 1999 following the sediment dredging (Complete mean at top of Table 4). A similar approximately 60% drop in seaweed biomass occurred between 1999 and 2000, presumably because the ammonia produced by dredging had been rapidly washed out to sea. In the final year of record so far a further drop of 21% occurred between 2000 and 2001.

Omitting the lower stations 1-3 that focuses most attention to areas of the main Upper Newport Bay where seaweed is high. In this region the decline was about 11 %/y between 1996 and 1998, increased 60 percent between 1998 and 1999

3.5. TOTAL NITROGEN AND PHOSPHORUS IN SEAWEED FROM UPPER NEWPORT BAY COLLECTED ON 1 AUGUST 2000

Nitrogen in the seaweed in Upper Newport Bay ranged from 1,800 to 4,000 mg/kg wet wt (0.18 – 0.4% wet wt or about 1.8-4 % dry wt. Table 5). Phosphorus in the samples ranged from 300 – 436 mg/kg wet wt (0.03-0.04% wet wt. or about 0.3-0.4% dry wt.). The mean ratio of N:P is thus 7.4:1 . This indicates an overall tendency for nitrogen limitation in the seaweeds. Values below 10:1 indicate N limitation; values above 10:1 show phosphorus limitation. Since the emphasis for seaweed control in the past has been on nitrate control in the watershed, the low N:P ratio shows that this strategy could be continued with the aim of further reducing nuisance seaweeds if required.

In terms of individual sites in Upper Newport Bay, the range of N:P ratios from a high of 10.5 to a low of 5.9 (Table 5). The lowest values were found furthest away from the inflow of San Diego Creek, which is logical if the main source of nitrogen is from the creek. In turn, the N:P ratio indicates that sediments are not an important source of nitrogen for the seaweeds in summer. Since sediment-N is regulated under the total nitrogen winter flow TMDL, this target may need to be reconsidered.

AUTHORS, TEAM MEMBERS AND ANALYTICAL SERVICES

This report was prepared by Alex J. Horne, Ph.D. (Alex Horne Associates) with assistance from Marcie Commins, Ph.D. (Commins Consulting). Field sampling was conducted by in 1999 by Alex Horne and James C. Roth, Ph.D. and with the assistance of Matt Tucker and Mary Brill (Orange County Public Facilities & Resources Department. In 2000 Orange County PF& RD took over the collection and treatment of the seaweeds. Marcie L. Commins, Ph.D. assisted with data analysis and figure preparation. Associated Laboratories, Orange, CA, carried out analyses of and nitrogen and phosphorus content of the seaweeds.

Table 1. Fresh biomass and species composition for macrophytes in Upper Newport Bay on 28 July 1999. The distance (dist) is distance in km from the estuary mouth; values for three replicates (a-c) and the mean are given in kg/m² fresh weight. The percentage composition of the dominant macroalgae in each replicate is shown as a percentage of the total (U = *Ulva*, E = *Enteromorpha*, C = *Centrocerus*, Cl = *Cladophora*)

Stn #	Dist.	Rep A	rep B	rep C	Mean	rep A	rep B	rep C
1	5.0	0.008	0.008	0.008	0.008	100% E	100% E	100% E
2	5.8	0.40	2.1	2.9	1.8	100% E	100% E	100% E
3	6.1	3.78	1.6	0.71	2.0	98% E, 2% U	100% E	100% E
4	6.6	0.9	2.3	2.7	2.0	100% E	100% E	100% E
5	6.8	0.0	2.9	5.6	2.9	99% E, 1% U	100% E	100% E
6	7.1	2.0	1.9	4.5	2.8	95% E, 5% U	95% E, 5% U	100% E
7	7.4	5.62	0.3	0.1	2.0	99% E, 1% U	85% E, 15% U	80% E, 20% U
8	7.6	0.1	0.11	0.38	0.21	75% E, 25% U	85% E, 15% U	85% E, 15% U
9	8.2	2.6	0.04	0.86	1.2	95% U, 5% C	50% U, 50% C	30% U, 70% C
10	8.2	0.90	1.2	1.0	1.0	95% U, 5% E	96% U, 2% E, 2% C	93% U, 2% E, 5% C
11	8.7	1.60	0.92	1.94	1.5	99% U, 1% C	95% U, 5% C	75% U, 25% C
12	8.9	2.1	1.70	1.9	1.9	100% U	80% U, 20% E	100% U
13	9.1	2.6	6.3	2.5	3.8	100% U	100% U	100% U
14	9.2	2.9	1.8	1.8	2.2	100% U	50% U, 50% E	80% U, 20% E
15	9.2	6.2	8.5	7.5	7.4	40% E, 60% U	97% E, 2% U, 1% C	86% E, 13% U, 1% C
16	9.2	2.1	1.3	0.51	1.3	100% U	100% U	100% U
17	10.0	4.57	1.4	1.8	2.6	72% U, 28% E	98% U, 2% E	100% U
18	10.1	2.96	3.8	1.31	2.7	100% E	100% E	80% U, 20% E
19	10.2	2.90	1.7	2.1	2.2	50% U, 50% E	100% U	90% U, 10% E
21	10.5	3.60	1.9	3.9	3.1	50% U, 50% E	90% E, 10% U	75% E, 25% U
23	10.8	6.7	3.4	5.5	5.2	95% E, 5% U	90% E, 10% U	80% E, 20% U
24	10.8	3.9	2.6	4.1	3.6	25% E, 2% U, 73% Cl?	2% U, 98% E&Cl?	100% Cl?
Mean		2.7	2.1	2.4	2.4			

Table 2. Fresh biomass and species composition for macrophytes in Upper Newport Bay on July 31-1 August 2000. The distance (dist) is distance in km from the estuary mouth, values for three replicates (a-c) and the mean are given in kg/m² fresh weight. The percentage composition of the dominant macroalgae in each replicate is shown as a percentage of the total (U = *Ulva*, E = *Enteromorpha*, C = *Centrocerus*, Clado = *Cladophora*)

Stn #	Dist.	Rep A	rep B	Rep C	Mean	rep A	rep B	rep C
1	5.0	0.020	0.020	0.020	0.020	Clado*	Clado	Clado
2	5.8	0.020	0.020	0.020	0.020	5% Clado	5% Clado	5% Clado
3	6.1	0.30	0.063	0.047	0.137	90%E, 10%U	90% C, 10%E	70% C, 15% U, 15% E
4	6.6	0.269	0.221	0.427	0.305	100% E	100% E	100% E
5	6.8	0.198	0.198	0.198	0.198	Trace E	Trace E + U	Trace E
6	7.1	ND	ND	ND	ND			
7	7.4	0.758	0.411	1.280	0.816	100% Clado	90% Clado	100% Clado
8	7.6	1.596	1.611	0.995	1.40	100% E	100% E	100% E
9	8.2	0.427	0.269	0.30	0.332	98% E, 2% C	90%U, 10% C	40%U, 30%E, 30% C
10	8.2	0.237	2.718	2.75	1.90	90% E, 10%U	60%E, 40% C	ND
11	8.7	1.64	1.69	1.31	1.55	95% C, 5% U	ND	90%C, 5%U, 5% E
12	8.9	1.63	0.30	0.57	0.83	50%U, 50% C	50%U, 50% C	50%U, 50% C
13	9.1	1.47	0.98	3.68	2.04	90%E, 9%U, 1%C	98%U, 2% C	95%C, 5% U
14	9.2	0.03	0.32	0.19	0.18	100% C	95%C, 5%U	100%C
15	9.2	1.07	1.14	0.13	0.77	50%U, 50% E	50%U, 50% E	100%U
16	9.2	0.98	3.44	1.15	1.86	95%U, 5%C	95%U, 5%C	95%U, 5%C
17	10.0	1.49	1.42	0.99	1.30	100% U	100% U	100% U
18	10.1	2.29	1.56	2.53	2.13	100% U	100% U	100% U
19	10.2	1.42	0.85	1.42	1.23	100% U	100% U	100% U
20		nd	nd	nd	Nd			
21	10.5	1.20	0.88	1.42	1.17	50%U, 50% E	50%U, 50% E	90%U, 10% E
22		nd	nd	nd	Nd			
23	10.8	0.50	2.05	0.36	0.97	50%U, 50% E	50%U, 50% E	nd
24	10.8	1.17	1.66	1.01	1.28	98%U, 2% E	95%U, 5% E	98%U, 2% E
Mean					0.96			

*Claco = No normal algae, some drift kelp (not in quadrats) and small amounts of the common filamentous green algae *Cladophora* (blanket weed). Nd = no data.

Table 3. Fresh biomass and species composition for macrophytes in Upper Newport Bay on July 26 2001. Only 8 sites were sampled in 2001 rather than the 20-24 in 1996-2000. The distance (dist) is distance in km from the estuary mouth, values for three replicates (a-c) and the mean are given in kg/m² fresh weight. The percentage composition of the dominant macroalgae in each replicate is shown as a percentage of the total (U = *Ulva*, E = *Enteromorpha*, C = *Centrocerus*, Cl = *Cladophora*). Less stations were sampled in 2001 a this date

Stn #	Dist.	Rep A	rep B	Rep C	Mean	rep A	rep B	rep C
2	5.8	0.043	0.003	0.012	0.019	95% E, 5% U	90% E, 10% E	99% E, 1% U
4	6.6	0.335	0.667	0.001	0.334	95% E, 5% C	95% E, 5% C	100% E
7	7.4	1.35	2.63	2.04	2.01	95% E, 5% U	95% E, 5% U	95% E, 5% U
9	8.2	0.065	0.635	1.33	0.678	100% U	10% U, 40% E, 50% C	80% U, 15% E, 5% C
13	9.1	0.130	0.917	0.805	0.617	95% U, 5% E	75% U, 20% E, 5% C	90% U, 9% E, 1% C
16	9.2	0.149	2.84	0.229	1.07	90% U, 19% E	95% U, 5% E	95% U, 5% E
19	10.2	1.14	1.48	0.479	1.03	95% U, 5% E	85% U, 10%, 5% C	80% U, 15% 10, 5% C
24	10.8	0.863	0.057	0.07	0.330	30% U, 40% E, 30% C	5% U, 90% E, 5% C	5% U, 90% E, 5% C
Mean					0.76			

Table 4. Various ways of determining the mean declines in seaweed biomass for Upper Newport Bay 1996-2001

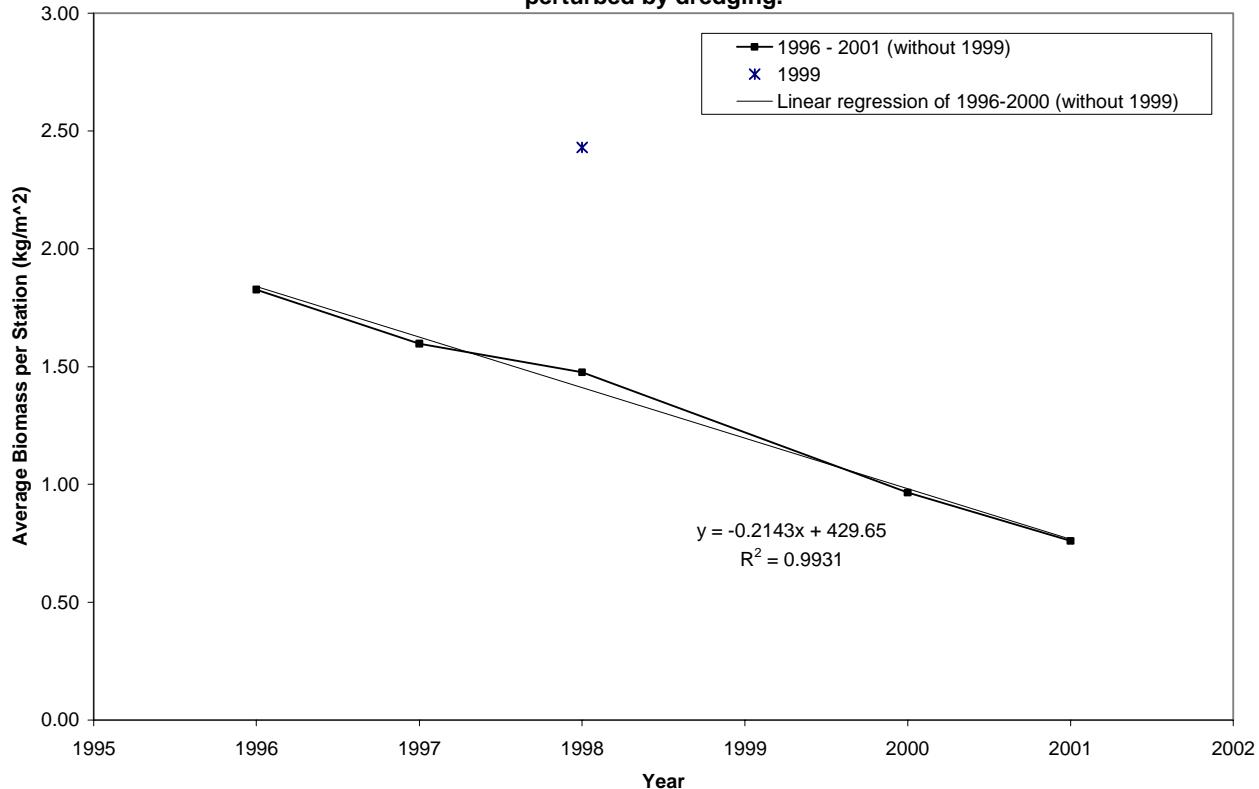
Type of average	Percent change between Years					
	96-97	97-98	98-99	99-00	00-01	96-01
1. mean	-13	-8	+65	-60	-21	-58
2. 20 Stations	-15	-4	+58	-58	-	-
3. Omit 1-3	-11	-11	+60	-57	-	-
Average	-13	-8	+61	-58	-	-

*Biomass over the three years has been averaged in three ways: (1) All data for each year (different # n), (2) Only similar stations (i.e. always same station numbers compared), and (3) Omit sta # 1-3 which are outside the main Upper Newport Bay. w = site washed away by El Nino floods, b = site too near skimmer colony, in = inaccessible for regular sampling (water too shallow for too long).

Table 5. Nitrogen and phosphorus concentrations in seaweeds from the main part of Upper Newport Bay collected on 1 August 2000. Values were converted from wet to dry wt by multiplying by 10. Species present were Cladophora (Clado), Ulva, and Enteromorpha (Ent). Site locations are shown on the map, Figure 1.

Station/species	Nitrogen %	Phosphorus %	Tissue N:P ratio
Station 7A Clado	1.78	0.301	5.9:1
Station 13B Ulva	2.33	0.382	6.1:1
Station 21 Ulva/Ent	3.98	0.377	10.5:1
Station 24A Ulva	2.89	0.436	6.6:1
Mean	2.75	0.374	7.4:1

Trend analysis of nuisance seaweeds in Upper Newport Bay 1996-2001. The 1999 data, shown as a cross, has been omitted from the statistical regression since the system was perturbed by dredging.



**Average Biomass per Station
Dec 2000 through Oct 2001**

